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Table of Contents

Vol. 39, No. 19 — September 19, 1940

News Developments

Trends: Increased Prices for Gasoline Is Market Need at This Time 51
Chemists Learn Details of Oil-Rubber Manufacture 57
Sparks From the News 58
Integration: Key to Efficiency in the Petroleum Industry ..... *Joseph E. Pogue* 59
Humble Practically Assured of Government Toluene Contract 60
Britain's Blockade Intensifying Oil Famine in Europe ..... *J. P. O'Donnell* 61
Tuscaloosa Discovery Heightens Oil Interest in Mississippi ..... *George Weber* 62
Defense Commission Delivers Report 63
News From the State Capitals 64
Editorial: Part and Parcel 65
Wage-Hour Law Application in the Oil Industry ..... *G. C. Street, Jr.* 66
Order Tightens Restrictions on Exports of Aviation Fuel 69
Humble Head Hits Texas Special Allowables Policy 70
Deaths 70
International News 73
Minneapolis Refinery to Add Cracking and Blending Facilities ..... *T. P. Sanders* 75
Pipe-Line Activity 76
Refinery Expansion 77
Natural Gasoline News 77
Natural Gas News 77
Programs and Meetings 80
California Marketers Still Uncertain and Confused ..... *L. P. Stockman* 195

Annual Pipe-Line Number

Pipe-Lines—Strong Arm in National Defense ..... *R. S. Ellison and E. F. Schmidt* 52
Important Pipe-Line Projects of 1940 54
1940 A Pipe-Line Year ..... *Paul Reed* 55
Controlled Pressures on Suction Lines of Trunk-Line Pumping Stations ..... *William G. Heltzel* 82
Efficient Communication System for Pipe-Line Operation ..... *Hezzie Clark* 84
Safety Practices in Testing High-Pressure Gas Lines ..... *D. K. Stephens* 86
Relocating Transmission Line in Flood-Control Area ..... *S. S. Donaldson* 87
Kansas Line Provides for Peak Loads ..... *Reece E. McGee* 88
Study of Internal Corrosion in Horizontal Gas Engines ..... *Walter H. Davidson* 89
Practical Suggestions 90
Oxyacetylene Welding and Cutting in Re-Laying Pipe 107
Integrating Tachometers Show Reciprocating Pump Flow 109
Recent Construction, Operating Improvements in O.N.G. System ..... *C. U. Daniels* 115
Automatic and Remote Station Control ..... *J. A. Beyhan* 122
Vapor-Phase Engine Cooling Introduced on Pipe Lines ..... *T. P. Sanders* 125
Welding Technique in Vanguard of Pipe-Line Building Progress ..... *A. F. Davis* 131
Precision Methods in Pipe-Line Operation ..... *H. O'Gara* 134
Pipe-Line Welding Practices Advance ..... *L. D. Sugg* 136
Pipe-Line Truck Has Many Uses in Construction and Maintenance ..... *Joe B. Tims* 138
Construction and Testing of Lines for High-Pressure Operation in Texas ..... *R. Vandercook* 138
Large Pipe-Line Suspension Bridge Is Constructed by Northern Natural ..... *T. P. Sanders* 145
Fifteen Years of Electric Pipe-Line Pumping ..... *W. H. Stueve* 149
Automatic Operation of Pipe-Line Pump Stations ..... *J. M. Pearson* 158
Three Years' Use Proves Success of Repair Job on Crankshaft ..... *Wade R. Reed* 163
Progress in Utilization of Natural Gas ..... *Richard H. Cook* 168
Personnel of Crude-Oil Pipe-Line Companies 173
Personnel of Gasoline Pipe-Line Companies 182
Personnel of Natural Gas Pipe-Line Companies 185

Field Operations

Field Operations Summarized 199
California ..... *L. P. Stockman* 200
Appalachian Fields 203
Kansas ..... *Dal Dalrymple* 204
Forest City Basin 204
Louisiana Gulf Coast .. *Neil Williams* 206
Texas Gulf Coast ..... *Neil Williams* 208
Oklahoma ..... *Dal Dalrymple* 209
Eastern Texas .... *R. Marne Sanford* 210
Permian Basin, Panhandle ..... *R. Marne Sanford* 211
Ohio, Kentucky 212
Rocky Mountain Area *T. R. Ingram* 215
North Central Texas *R. Marne Sanford* 216
Among Drilling Contractors 218
Southwest Texas ..... *F. L. Singleton* 220
N. Louisiana, Arkansas *George Weber* 221
Illinois 224
Michigan ..... *Otto C. Pressprich* 228
Mississippi ..... *George Weber* 229
Canada ..... *Victor Lauriston* 230
Wildcats ..... Included in Field Operations

Markets and Prices

Group 3 Market ..... *H. Stanley Norman* 234
New York Market ..... *J. P. O'Donnell* 235
A.P.I. Refinery Report 235
Tank-Wagon Market 236
Refinery Prices 237
Crude-Oil Prices 247

Additional Features

Record of Oil Securities 231
Personal Paragraphs 232
Classified Advertising 238-239
Advertisers' Index 240

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SOMASTIC

REG. U. S. PAT. OFF.

PIPE COATING

A dense, thick Asphalt-Mastic Coating... *Available Everywhere*

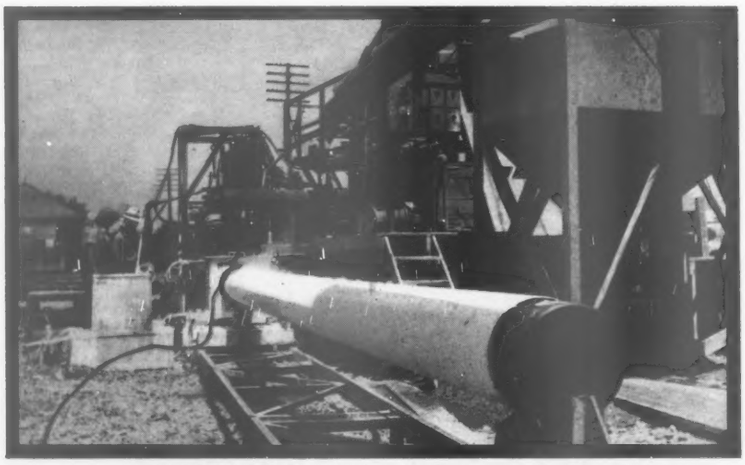
TEXAS... Lining up for welding on 8⅝-inch O. D. line

CALIFORNIA... Applying field joint form to 22-inch line for casting thick, overlapping field joint of SOMASTIC Pipe Coating.

LOUISIANA... River crossing on 12¾-inch gas line traversing 13 miles of low marsh lands.

SOMASTIC Pipe Coating, now available throughout the country, has proved its positive ability to protect pipe lines under the most severe soil conditions.

Pipe line operators are selecting it as the solution to their corrosion problems.



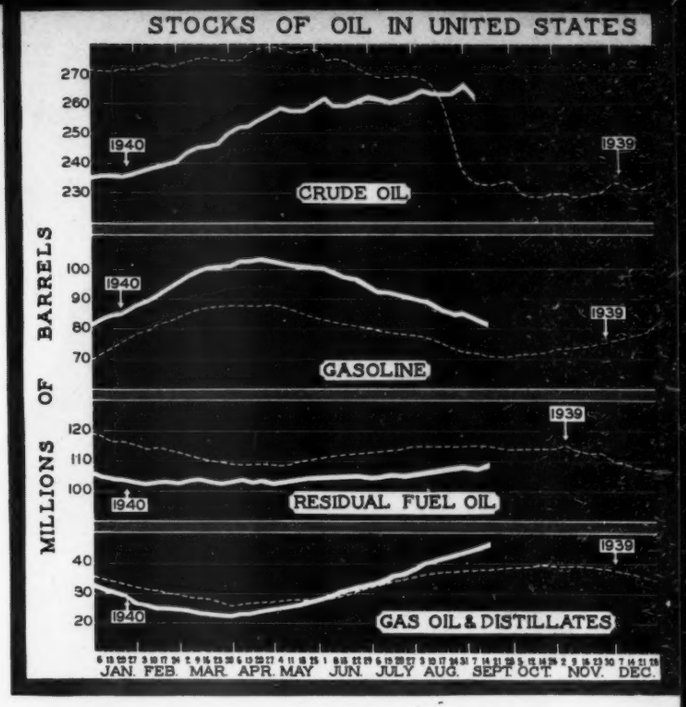
PENNSYLVANIA... Railhead plant coating 10 miles of 16-inch pipe.

INDUSTRIAL ENGINEERING CO.

WILMINGTON, CALIFORNIA — HOUSTON, TEXAS

Trends

Increased Prices for Gasoline Is Market Need at This Time



AS the industry nears the final quarter of 1940 it becomes increasingly apparent that the major market need is higher prices for gasoline extending from the refinery to the filling stations. The need includes natural gasolines which so far this year have been at the lowest price levels in the history of that branch of the industry.

CRUDE PRODUCTION *3,650,540 bbl. daily average—up 33,126 bbl. One year ago 3,430,710 bbl.*

CRUDE STOCKS *262,716,000 bbl. as of September 7—down 3,149,000 bbl. One year ago 233,826,000 bbl.*

GASOLINE STOCKS *83,300,000 bbl. as of September 14—down 994,000 bbl. One year ago 71,753,000 bbl.*

RESIDUAL FUEL-OIL STOCKS *109,135,000 bbl. as of September 14—up 1,055,000 bbl. One year ago 114,979,000 bbl.*

GAS OIL AND DISTILLATES *46,648,000 bbl. as of September 14—up 1,143,000 bbl. One year ago 37,848,000 bbl.*

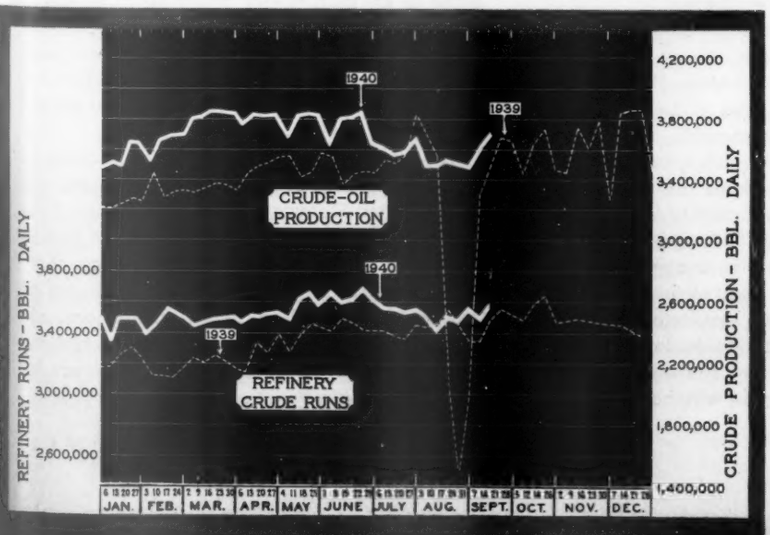
REFINERY RUNS *3,580,000 bbl. daily week ended September 14—up 80,000 bbl. One year ago 3,470,000 bbl.*

The refinery situation in regard to gasoline and its importance to the industry generally is revealed by an analysis of a situation in Oklahoma (Group 3) which is representative of the entire Mid-Continent and also is indicative of comparative price trends in all refining centers. The yields from a barrel of crude oil used in this comparison are: Regular-grade gasoline, 25 gal.; kerosene, 2.5 gal.; gas oil and distillate, 5 gal., and residual fuel oil, 8 gal. The remainder constitutes gas and operating loss. Published prices in cents per gallon for these products now and a year ago are: Gasoline, 1940, 4½ and 1939, 5½; kerosene, 1940, 3¾ and 1939, 3⅝; gas oil and distillate, 1940, 3.4 and 1939, 2⅞; residual fuel oil, 1940, 1¼ and 1939, 1 cent.

These changes in prices mean that the overall refinery return from a barrel of Oklahoma crude has dropped from $1.69 a year ago to $1.49 at present, a decline of 20 cents per barrel. In 1938 the average return for the year based on these same yields was $1.60; 1937, $1.87 and 1936, $1.83.

These comparisons show how dependent the industry generally is on satisfactory prices for gasoline. Because the demand for furnace oils and other distillates has increased greatly over the past 3 years many have made the erroneous assumption that what is received for gasoline in refinery revenue is no longer important. While there are individual cases in which skimming plants operating with low-gravity crudes are able to rely on the intermediate and heavy oils for a large part of their plant revenues, the great majority of refinery operators are in black or red, dependent on what they obtain for their gasoline output. The fact that prices for kerosene, gas oil and distillate and fuel oil are slightly higher than they were a year ago is of little consequence in the face of a 1-cent per gallon decline in gasoline quotations.

In many cases a detailed study would reveal market conditions much less favorable than the above analyses indicates. In these instances refiners are guaranteeing certain margins to jobbers, who in turn are supporting a demoralized retail-price condition resulting in net tank-car prices under the published quotations which are based on spot sales. There are numerous instances in which the net-back on gasoline to the refineries is less than 4 cents per gallon. These are the data being stressed by those who urge quick correction of the gasoline-inventory situation.


REFINERY RUNS - BBL. DAILY
CRUDE PRODUCTION - BBL. DAILY
CRUDE-OIL PRODUCTION
REFINERY CRUDE RUNS
1940
1939
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

DAILY AVERAGE PRODUCTION FOR WEEK

	Sept. 14, 1940	Sept. est. of demand	Bur. Mines September state allowables	Sept. 7, 1940
Arkansas	73,425	69,700	75,105	73,255
California	637,250	593,000	571,000	623,500
Eastern states	102,700	101,200	.....	103,200
Illinois	364,128	430,000	.....	377,683
Kansas	194,600	170,700	190,000	165,750
Louisiana	285,435	274,700	274,854	278,080
North Louisiana	*65,385*	.....	.....	*64,830*
Louisiana Gulf Coast	*220,050*	.....	.....	*213,250*
Michigan	50,004	55,700	52,000	52,253
Mississippi	25,850	9,700	..	28,220
New Mexico	102,490	105,300	100,300	102,490
Oklahoma	412,925	397,000	390,000	417,475
Rocky Mountain states	93,620	97,000	..	96,320
Texas	1,308,113	1,320,000	1,344,338	1,299,188
East Texas	*374,924*	.....	.....	*374,897*
West Texas	*228,145*	.....	.....	*221,500*
North Central Texas	*126,300*	.....	.....	*125,850*
East Central Texas	*78,200*	.....	.....	*78,648*
Texas Panhandle	*76,471*	.....	.....	*76,496*
Gulf Coast Texas	*319,250*	.....	.....	*316,550*
Southwest Texas	*104,723*	.....	.....	*105,247*
United States	3,650,540	3,324,000	.....	3,617,414

Pipe Lines—National

"In time of grave danger . . . our great underground network of pipe lines . . . could interconnect their facilities and by joint action, forgetful of self-interest, serve the national defense more effectively, more safely, more economically, than it would be possible for any other form or means of transportation to do."

By

R. S. ELLISON

President, Stanolind Pipe Line Co.

AS the vital connecting link from well to refinery, the crude-oil pipe lines serve directly both the producer of crude oil and the manufacturer of refined products.

This method of operation affords a steady, reliable market for the thousands of small producers in the oil-producing states and a constant, dependable supply of crude oil at reasonable cost to over 450 operating refineries located in 36 states. Crude-oil pipe lines transport from some 350,000 wells, including strippers, in 21 states, and deliver to their connected refineries an average of around 3,500,000 bbl. of crude oil daily through 112,000 miles of pipe. This vast underground network of piping, together with over 8,000 miles of pipe lines carrying gasoline and other refined oils from refineries to various marketing centers, comprises in fact one of the most important agencies American business can contribute for our national defense. Gasoline pipe lines are equally vital in the distribution branch of the petroleum industry, and in time of war would be invaluable in serving mechanized war and other equipment.

These facilities did not come to pass unplanned. They are the direct result of the growth and development since 1859 of a great American industry under a free and representative form of government.

There is no get-rich-quick glamour about a pipe liner, for his problems are real ones, involving the size, weight, and type of pipe necessary to conform with the working pressures and hydraulics of the pipe-line system; the design and location of pumps; engines, motors, electric automatic and semiautomatic control systems; junctions, manifolds, tankage; water cooling, lubricating, and fuel-oil systems, as well as the telegraph and telephone lines serving each pipe-line system. Pipe-line facilities are operated and their organizations function while others play and sleep, and in time of war no more loyal, capable, and efficient organizations would be found enrolled in our national defense than those trained to discharge their duties in the operation of our crude-oil and gasoline pipe-line systems.

It is true that out of sight is usually out of mind, but this is not true as to the operating personnel of the pipe lines. Their operation calls for both technical and practical men of the finest grade. These lines must be and are operated each day of the year and 24 hours of each day. There can be no shutdown without practical abandonment of any operating pipe line, whether it be cold, hot, wet, or dry weather, or whether the line traverses a settled or desert region; whether along improved highways or whether trails must be constructed; whether cities, towns, railroads, or other conveniences so important and necessary for other industries are at hand or within convenient distance. Crude-oil pipe lines, in particular, have to be built where crude oil is found in order to provide an outlet for such production and to bring it at reasonable cost to convenient locations, and in adequate quantities for its use by rich and poor alike in every neighborhood in this country.

The conveniently located service stations of the industry in practically every neighborhood of the United States enable the consuming public, and in time of war would enable the armed forces of the United States, to secure their refined petroleum products with a minimum of inconvenience and at reasonable prices, all of which reflect the efficiency of transportation, as well as the efficiency of the producers in

(Continued on Page 78)

Strong Arm in Defense

"All the larger natural-gas properties with long transmission lines from producing areas to concentrated markets are today giving continuous, uninterrupted, and efficient service and are therefore, of necessity, well prepared for many of the emergencies that might arise during a state of war."

By

E. F. SCHMIDT

Vice President, Lone Star Gas Co.
Chairman, Natural Gas Section,
American Gas Association

AMERICAN business has responded unselfishly and patriotically to the call of our Government for preparedness in its national-defense program. The natural and manufactured-gas industries of the United States, fully aware of the vital role they may be called on to play in the nation's industrial preparedness, through the American Gas Association promptly pledged united support and cooperation to the various governmental departments concerned with national defense. This offer of cooperation was well received by our Government.

Steps were immediately taken for the development of plans to maintain uninterrupted service to essential industries using gas fuel, to augment the supply for increased use due to industrial expansion of war industries, and to protect their properties against internal attacks and external enemies. Many of our war industries, such as airplane factories, munition factories, tank and engine factories, and practically all the industries involved in the manufacture of the varied war materials, look to the gas industry for their dependable fuel supply.

During World War I, the manufactured-gas industry furnished a large part of the toluene so essential in the manufacture of TNT. This branch of the gas industry may again be called upon for maximum quantities of this very valuable byproduct although the petroleum industry, through research, has perfected a process whereby toluene can readily be manufactured in oil refineries.

All the larger natural-gas properties with long transmission lines from producing areas to concentrated markets are today giving continuous, uninterrupted, and efficient service and are therefore, of necessity, well prepared for many of the emergencies that might arise during a state of war. Experienced and well-organized repair crews are strategically located along these lines to maintain their continuous operation and are prepared at a moment's notice with men and materials to take care of breaks caused by floods, wind, and fire. These crews could be augmented in case of war to take care of destruction caused by invading armies.

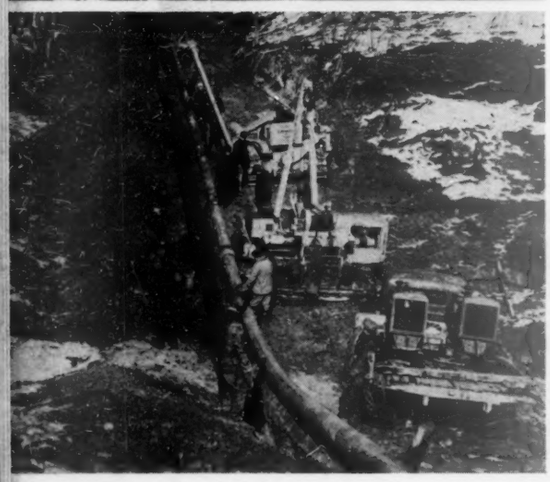
The development of the cracking and polymerization process has shown that there are many potential materials for which certain hydrocarbon constituents of natural gas would form the logical base. Many of these new products may be considered as potential war materials. In the realm of combustion, with the complete control readily attained with natural gas, partial combustion produces the many different types of heat-treating atmospheres required by many industries manufacturing war materials.

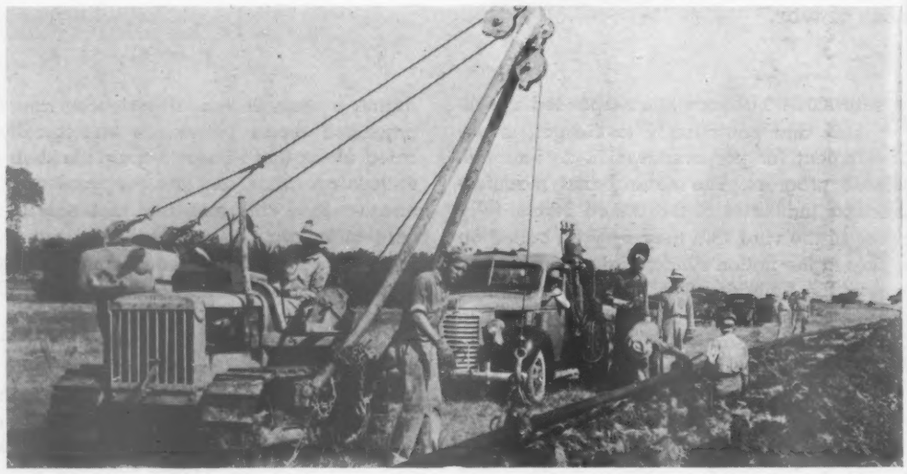
Some natural-gas companies are prepared to make large quantities of butane and isobutane, essential hydrocarbons for the manufacture of high-octane aviation fuel. These sources of supply may be vital in connection with our national defense. Natural gas processed at low cost by a method recently discovered may form a new source for explosives. The product compares favorably with nitroglycerin and double-base military powders. Research carried on during many years has developed many useful products and base materials for war products.

The gas industry of the United States as a whole has quickly and quietly organized to give full and complete assistance in our national-defense program and prepare itself as well as possible for the future which seems still uncertain.

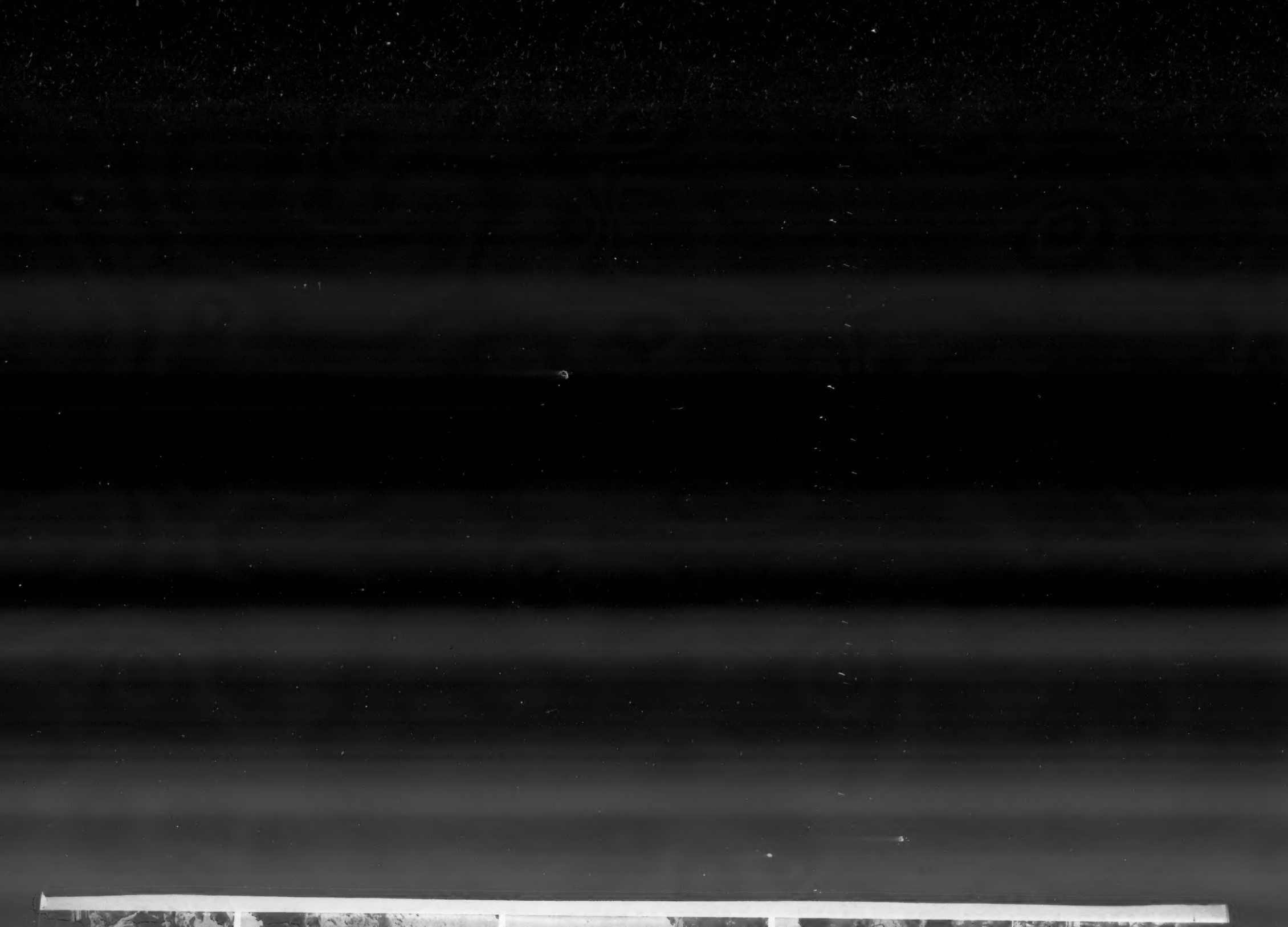
Important Pipe-Line Projects of 1940

Top right: Bench made for tractor on side of mountain; Manufacturers Light & Heat Co.'s 140-mile line in western Pennsylvania; Williams Brothers Corp., contractor. Right: Creek crossing made in looping 92 miles, Memphis Natural Gas Co.; N. A. Saigh Co., contractor. Outside column top: Carrying section of pipe, Michigan Gas Transmission Co.'s 55-mile line in Indiana; T. R. Jones, contractor. Second down: Construction of loops for crude-oil system under winter conditions, Texas-Empire Pipe Line Co., 80 miles in Illinois. Williams Brothers Corp., contractor. Third down: Laying of gasoline line through Florida swamps, Southeastern Pipe Line Co., 450-mile project. Williams Brothers Corp., contractor. Bottom left: Welding section in composite-type construction used in building 24-in. loops for Panhandle Eastern Pipe Line Co., Kansas. Truman-Smith Construction Co., contractor.





Above: Laying 200-mile 4½-in. Fort Worth-Oklahoma City line, Magnolia Pipe Line Co., Williams Brothers Corp., contractor. Right: Tack welding 14-in. pipe, Texas-New Mexico Pipe Line Co., crude-oil line, Monument, N. M., W. G. Hanrahan, contractor. Below: Stovepiping 24-in. laid by solid-weld construction in looping the system of Northern Natural Pipe Line Co., Kansas. C. S. Foreman Co., contractor.



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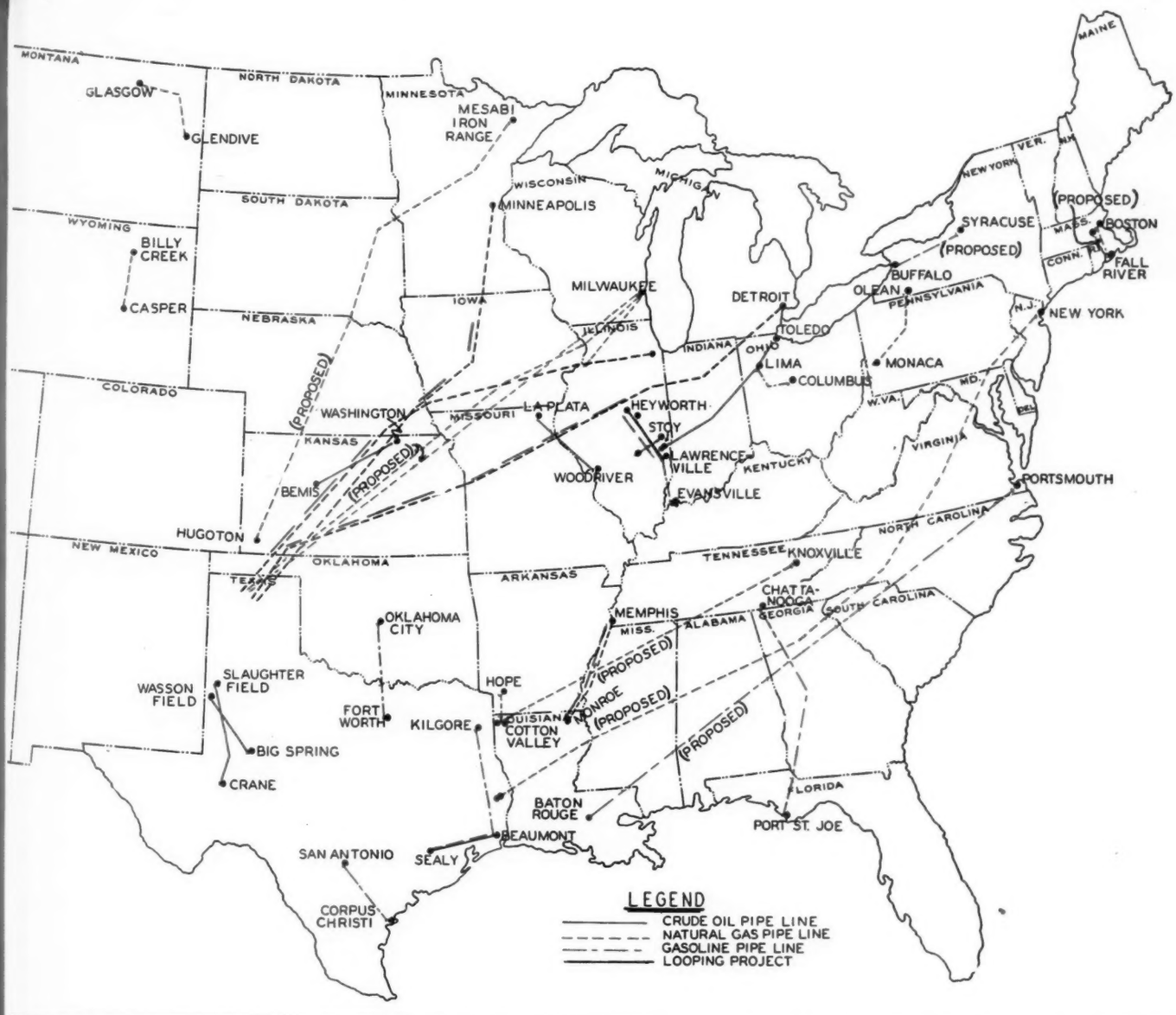


Map showing crude oil, natural gas and gasoline pipe lines completed and under construction and proposed in 1940

1940 A Pipe-Line Year

By PAUL REED

PIPE-LINE construction has been conducted this year on a scale which promises to break the record set in 1939 when twice as much pipe was laid as in either of the two preceding years. During the first 9 months of 1940, new pipe-line construction already completed and now in the process of being laid represents more than 5,000 miles. According to present indications the total mileage for the year will exceed 6,000. At this time last year the total mileage was 4,000 and at the end of the year the total was more than 5,000 miles. Operations have been divided fairly evenly between the three branches of the pipe-line industry. The principal projects completed or in the course of construction consist of approximately 1,500 miles of crude-oil lines, 1,200 miles of natural-gas lines, and 1,100 miles of gasoline lines.

This year construction work started at an unprecedented rate in the early winter months. Now, when the year is entering the last quarter, which is normally a season for recession in pipe-line activity, an extensive amount of work is in sight for the remaining months of this year as well as for next year, both in this country and in South America. Proposed projects include 625 miles of crude-oil lines, 1,200 miles of gasoline lines, and 5,337 miles of natural-gas lines. However, since three of the major natural-gas projects aim to serve the same markets, it is unlikely that more than one of these will be built. Nevertheless, the total mileage for the proposed projects which have been announced is approximately equal to that of this year's new construction. In addition there are several proposed projects which are being studied; these represent several hundred miles which have not been announced publicly.

The largest pipe-line program, now in the process of being carried out, is that of the Natural Gas Pipeline Co. of America, which is building a 162-mile 20-in. lateral to Milwaukee from its Panhandle-to-Chicago trunk line. In order to provide sufficient facilities for serving new markets in Illinois and Wisconsin, the company is conducting economic studies for expanding main-line capacity. It is reported that this company may build a 700 to 800-mile 28-in. line between the Panhandle and northern markets. Part of this program for trunk-line expansion may get under way this fall.

Permits to serve the Milwaukee market are being sought by Western Natural Gas Co. and Independent Natural Gas Co. from the Federal

Power Commission which has set a hearing October 7. Considerable attention is now being directed to the projects of Reserve Gas Pipe Line Co. for transmitting Texas Gulf Coast gas to New York City. The F.P.C. will hold a hearing on September 23 to consider the application of Tennessee Gas & Transmission Co. for transmitting Louisiana gas to Nashville and Chattanooga, Tenn., and Ashville, N. C. The proposed project of Kansas Pipe Line & Gas Co. for supplying the Mesabi iron range of Minnesota with Hugoton, Kansas, gas depends on the willingness of the federal Government to lend a larger amount than was originally requested, in order to provide fuel for ferro-manganese ore production.

The Plantation Pipe Line Co., organized by Standard Oil Co. of Kentucky, Standard Oil Co. (New Jersey), and Shell Oil Co., Inc., to transport gasoline and refined products to Portsmouth, Va., is confronted with the difficulties which are being encountered in obtaining permits and right-of-way in the southeastern states.

Large South American Line

It has been announced that the Argentine Government is considering the construction of a 550-mile 12-in. pipe line which may get under way early next year.

The spheres of pipe-line activity which have received an unusual amount of attention this year are the areas in the southeastern, middle western, and even the northeastern states.

Construction in the Middle West has been for the purpose of providing additional outlets for transporting crude oil from the Illinois fields. Extensive looping programs have been carried on by major natural-gas trunk-line systems serving middle western and southern cities in order to take care of the requirements of growing markets. In 1939 there was a pronounced upturn in natural-gas consumption. Domestic sales of natural gas registered a gain of 6.7 per cent over the preceding year; sales of natural gas for industrial purposes increased 11.2 per cent.

This year consideration is being given to the possibilities of taking care of peak loads by a program which involves the storage of liquid methane at strategic points. Facilities have been installed by Hope Natural Gas Co. and East Ohio Gas Co. for this new type of operation. It appears that this practice may enable natural-gas pipe-line companies to operate their systems with a higher load factor throughout the year.

Of great significance to the industry are the changes which have come as the result of gasoline pipe-line expansion and the transportation practices which gasoline pipe lines have adopted. The marketing and transportation situation in the Chicago area has been definitely affected by gasoline lines. Phillips Pipe Line Co. last year extended its system from East St. Louis to Chicago. This year, the Shell crude-oil line from St. Louis to Chicago was converted to gasoline and refined-products transportation. Shell has extended its Wood River-Lima gasoline line to Springfield and Columbus, Ohio. Socony-Vacuum Oil Co., Inc., has been active in providing gasoline pipe-line facilities through its own project in western New York State as well as through the two important projects undertaken this year by its subsidiary, Magnolia Pipe Line Co. in Texas and Oklahoma. Through its new line from Lawrenceville, Ill., to Mount Vernon, Ind., Texas Co. is provided with an outlet which makes it possible to utilize the cheap transportation afforded by the Ohio and Mississippi rivers.

Inland waterways, including both the rivers and the Great Lakes, have been used to an increasing extent in recent years by major companies for the economical transportation of crude oil and refined products. River and lake terminals for pipe lines have become more important.

The outstanding feature of gasoline pipe-line operation in the last 2 years has been the transportation of a variety of refined products including five or six grades of gasoline, kerosene, gas oil, diesel oil, as well as shipments of special products. This type of operation requires exactness in the handling of various shipments. In the Shell line, as many as 17 shipments may be handled in the line at one time between Wood River, Ill., and Columbus, Ohio. Pipe-line transportation of refined products is safe and economical. It is now recognized that wherever a company is assured of sufficient volume, substantial savings can be made by transporting through pipe line rather than by railroad.

Year's Greatest Project

The gasoline pipe-line project of the greatest magnitude undertaken this year is that of the Southeastern Pipe Line Co. from the Florida Gulf Coast to the Tennessee River Valley at Chattanooga. Although this 450-mile line was nearly completed in June, it must lie inactive until the legislature passes a new law to enable the company to cross railroads by exercising the right of eminent

(Continued on Page 78)

LIST OF 1940 LINES COMPLETED OR UNDER CONSTRUCTION . . .

Crude-Oil Lines

Texas-Empire Pipe Line Co., 80 miles of 10 and 12-in. (loops) Salem to Wilmington, Ill.

Sohio Pipe Line Co., 240 miles of 12-in. from Stoy, Ill., to Lima, Ohio, and other projects which altogether represent a total mileage of 350 miles.

Illinois Pipe Line Co., 57 miles of 8 and 10-in. from Bridgeport to Enfield, Ill., and 40 miles of 10-in. from Martinsville to Brownstown, Ill.

Buckeye Pipe Line Co., 55 miles of 10-in. from Cygnet to Lima, Ohio.

Stanolind Pipe Line Co., 135 miles of 10-in. from Bemis field in western Kansas to Washington, Kans.

Stanolind Pipe Line Co., 180 miles of 12-in. from La Plata, Mo., to Wood River, Ill.

Basin Pipe Line Co., Cosden, 93 miles of 6-in. from Wasson field to Big Spring, Tex., and gathering-system lines making a total mileage of 112 miles.

Texas-New Mexico Pipe Line Co., 105 miles of 8, 10, and 14-in. from Slaughter field to Crane, Tex., and 15 miles of 4-in. from Artesia to Maljamar field, making a total of 125 miles.

Transit & Storage Co., 68 miles of 8-in. (loops) Cygnet, Ohio, to Sarnia, Ont., Canada.

Tuscarora Oil Co., Ltd., 27 miles of 8-in. from Gardenville to Barton, Pa.

Continental Pipe Lines Co., 109 miles of 4, 5, 6, and 8-in. from San Diego to Corpus Christi and other lines connected with the system in this area.

Magnolia Pipe Line Co., 23 miles of 8-in. from Bay City to West Columbia, Tex., and 57 miles of 8-in. (loops), Sealy and Beaumont, Tex., making a total of 80 miles.

Sinclair Prairie Pipe Line Co., 66 miles of 8-in. (loop), K.M.A. to Hensley, Tex.

National Refining Co., 54 miles of 8-in. from Hoosier to Coffeyville, Kans.

Proposed Crude-Oil Lines

A. B. Cobb and Yale Oil Corp., 75 miles of 4-in. from Lance Creek to New Castle, Wyo.

Yacimientos Petroliferos Fiscales, Argentine Government, 550 miles of 12-in. from Lulunta and Tupungato fields to Rio Parana, Argentina.

Natural-Gas Lines

Panhandle Eastern Pipe Line Co., 242 miles of 20, 22 and 24-in. (loops) in Kansas, Missouri and Illinois.

Northern Natural Gas Co., 109 miles of 24-in. and smaller pipe (loops), in Kansas, Nebraska and Iowa.

Natural Gas Pipeline Co. of America, 162 miles of 20-in. from Geneseo, Ill., to Milwaukee, Wis.

Manufacturers Light & Heat Co., Manufacturers Gas Co., Pennsylvania Fuel Supply Co., 140 miles of 8 and 10-in. between Monaca and New York State line near Olean, N. Y.

Michigan Gas Transmission Co., 55 miles of 24-in. from Montezuma to Crawfordsville, Ind.

Montana-Dakota Utilities Co., 170 miles of 3 and 8-in. from Glasgow to Glendive, Mont.

Memphis Natural Gas Co., 92 miles of 18-in. (loops) in Louisiana, Arkansas, Mississippi, and Tennessee.

Louisiana Nevada Transit Co., 97 miles of 6 and 8-in. from Cotton Valley, La., to Hope and Okay, Ark.

Cities Service Gas Co., 60 miles of 12-in. from Cunningham to Wichita, Kans.

Northern Pipe Line Co., 100 miles of 4, 6, and 8-in. from Casper, Wyo., to Billy Creek field.

Southern Union Gas Co., 31 miles of 5-in. from Albuquerque to Belen, Los Lunas, and Isleta, N. M.

United Gas Pipe Line Co., 35 miles of 2-in. (lateral) from Terrebonne Parish to trunk line.

Proposed Natural-Gas Lines

Natural Gas Pipeline Co. of America, 700 to 800 miles of 28-in. from Panhandle to Chicago.

Reserve Gas Pipe Line Co., 1,500 miles of 24-in. from Texas to New York City.

Tennessee Gas & Transmission Co., 400 miles from North Louisiana to eastern Tennessee and North Carolina.

Kansas Pipe Line & Gas Co., 1,040 miles of 16-in. from Hugoton, Kans., to Mesabia iron range in Minnesota.

Western Natural Gas Co., 770 miles from Panhandle to Milwaukee, Wis.

Independent Natural Gas Co. (Phillips Petroleum Co.), 877 miles of 22-in. from Panhandle to Milwaukee, Wis.

Gasoline Pipe Lines

Southeastern Pipe Line Co. (Gulf and Pure interests), 450 miles of 6 and 8-in. from Port St. Joe, Fla., to Chattanooga, Tenn.

Magnolia Pipe Line Co., 139 miles of 4 and 6-in. from Corpus Christi to San Antonio, Tex.

Magnolia Pipe Line Co., 200 miles of 4½-in. from Fort Worth, Tex., to Oklahoma City, Okla.

Socony-Vacuum Oil Co., Inc., 171 miles of 4 and 6-in. from Buffalo to Syracuse, N. Y.

Shell Oil Co., Inc., 106 miles of 6-in. from Lima to Columbus, Ohio.

Texas Co. (formerly known as Lawrence Pipe Line Co.), 68 miles of 6-in. from Lawrenceville, Ill., to Evansville, Ind.

In addition, mention should be made of Magnolia Pipe Line Co.'s line consisting of 182 miles of 4, 5, and 6-in. from Kilgore to Beaumont, Tex., which was put in operation shortly before the beginning of the year for the transportation of natural gasoline and butanes.

Proposed Gasoline Pipe Lines

Plantation Pipe Line Co., Standard Oil Co. of New Jersey, Standard Oil Co. of Kentucky, Shell Oil Co., Inc., 1,200 miles of 8 and 12-in. from Baton Rouge, La., to Portsmouth, Va.

The principal section of this annual

PIPE-LINE NUMBER

starts on Page 81

For index of articles in section see Page 49

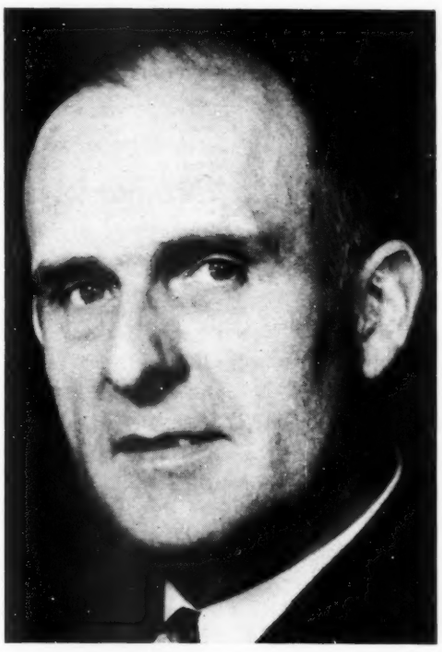
Chemists Learn Details of Oil-Rubber Manufacture

DETROIT, Mich., Sept. 17.—For the first time the characteristics and potential uses of petroleum-made rubber were enumerated here during the 100th annual convention of the American Chemical Society. This was done by Dr. Per K. Frolich, speaking before the general session, and served as a fitting prelude to the symposium of the "Contributions of Petroleum Chemistry to the Automotive Industry." The latter was arranged by T. A. Boyd, of General Motors Corp.; G. M. Magerick, of Standard Oil Co. of Indiana; E. C. Williams, of Shell Development Co.; and M. R. Fenske, of Pennsylvania State College, chairman.

Many other items of timely interest were presented for discussion before the many group sessions, which included representation from every class of industry and scientific research, but no group commanded greater attention than the Petroleum Division. Here the symposium was presented and included were papers on five distinct phases of petroleum research. These could be readily identified as (1) motor fuels, (2) lubricants, (3) solvents, (4) road materials, and (5) raw materials for chemical manufacture. Each of these could have easily called for prolonged discussion, as hundreds of researchers are busily engaged in each, but the meeting here dealt primarily with the most practical and timely problems.

Motor Fuels

Probably the most practical correlation of timely data presented on the subject of motor fuels was that contained in the paper by Dr. Gustav Egloff and P. M. Van Arsdell of the Universal Oil Products Co. In it the authors reviewed the characteristics of pure motor-fuel components and grouped the various series of hydrocarbons according to their octane ratings. They also tabulated its octane rating based on both the motor method and the research method. As a convenience, the authors presented a table in which they tabulated the operating conditions for making the test.



DR. PER K. FROLICH

Director of research, Standard Oil Development Co., who gave for the first time, the details regarding petroleum's newest contribution to the self-sufficiency of United States industry

Lubricants

That portion of the program devoted to lubricants gave prominence to the use of additives. The discussion of wear prevention through the use of such additives was of unusual interest. It was stated in a paper by Otto Beeck, J. W. Givens, A. E. Smith and E. C. Williams, of the Shell Development Co., that it was possible to increase "wear prevention" quality of a lubricant to 17 times normal by the use of certain additives. The authors contended that mechanics of metal wear is not understood. However, they said their work had shown that wear could be reduced by the addition to the lubricating oil of two classes of compounds. The authors said:

"The first group consists of organic compounds whose molecules take the form of long threads which are able to attach themselves by chemical forces, arising from the special structure of the molecules, to the surface of the metal. These compounds greatly increase the tightness with which a film of oil is held between the moving metal surfaces, even under high loads.

"However, the favorable effect of such agents is lost unless the metal surfaces themselves are highly polished and maintain their high polish in service. Even the best polish attainable by mechanical means leaves the surface covered with microscopic irregularities or roughnesses, and it is in the removal of these that the second type of addition agent finds its usefulness.

"Addition agents of the second type have the property of combining, under the influence of the heat generated by the rubbing surfaces, with the surface layer of the metal to form low-melting alloys. The result is that when the tiny hills on the surfaces become engaged with each other (under normal conditions they would rasp themselves off, causing wear or even actual tearing of the metal surface) isolated spots of very high temperature are produced at the points of contact which cause the surface layer of low-melting alloy to melt and flow just at those points where the hills come into contact.

"Laboratory tests using highly sensitive apparatus, capable of reproducing wear measurements within an accuracy of 1 per cent, have

(Continued on Page 194)

COMPARISON OF OPERATING CONDITIONS FOR THE GASOLINE KNOCK-TEST METHODS USING THE C.F.R. ENGINE AS A BASIS*

All methods use 3¼-in. by 4½-in. variable-compression cylinder unless otherwise noted

	Motor method	L-3 method	1939 research method	Old research method	C.F.R. aviation method (1940) (1-C)	Army method (AN 9525)§ (official for military service until Jan. 1941)
Speed	Constant, 900 ±9 r.p.m.	Constant, 900 ±9 r.p.m.	Constant, 600 ±6 r.p.m.	Constant, 600 ±6 r.p.m.	Constant, 1,200 r.p.m. ±12 r.p.m.	Constant, 1,200 ±20 r.p.m.
Jacket temperature	Constant, ±1° F. Held between 209°-215° F.	Constant, ±1° F. Held between 209°-215° F.	Constant, ±1° F. Held between 209°-215° F.	Constant, ±1° F. Held between 209°-215° F.	Constant at 374° ±2° F. within ±9° F.	Constant at 330° ±2° F. within ±5° F.
Spark advance	Automatic, 26.0° at 5:1 compression ratio	Automatic, 16° at 5:1 compression ratio	Fixed, 13° for all compression ratios	Automatic, 22.5° at 5:1 compression ratio	Fixed, 25° for all compression ratios	Fixed, 30° for all compression ratios
Mixture temperature	300° F. ±2° F.	260° F. ±2° F.	125° F. ±2° F.†	Room temperature†	Intake air 125° F. ±5° F. Mixture temp. 220° F. ±2° F.	Room temperature†
Intake valve	Shrouded	Shrouded	Shrouded	Plain	Plain	Plain
Fuel blends for checking engine	49.1% C.P. benzene in A-6 equals 64.2% C-11 in A-6 (65 oct. No.)	46.7% C.P. benzene in A-6 equals 63.5% C-11 in A-6 (65 oct. No.)	48.4% C.P. benzene in A-6 equals 72.5% C-11 in A-6 (70.0 oct. No.)	65 oct. No.	85% S-1 in M-2 vs. C.P. benzene to give same thermal plug reading	88% isooctane in *n*-heptane vs. C.P. benzene to give same thermal plug temp.
Compression ratio for checking engine‡	5.3:1	5.5:1	5.75:1	5.3:1	.....	.....
Instrumentation for determining knock	Bouncing pin and knock-meter	Bouncing pin and knock-meter	Bouncing pin and knock-meter	Bouncing pin and knock-meter	Thermal plug	Thermal plug

*J. S. Bogen, Universal Oil Products Co. †Intake air temperature, not mixture temperature. ‡Ratio must be corrected for barometer. §2⅝-in. by 4½-in. variable-compression cylinder.

SPARKS . . . FROM THE NEWS

SUPPLY AND DEMAND: The sudden interest on the part of oil companies in the possibilities of the older fields reflects in part some of the failures in 1940's exploration results.

NO COMPETITION: They used to say that the only competition pipe lines had was water. Now they are building a line in the East to transport gasoline formerly moved by an inland waterway.

AS USUAL: Motor-oil additives are available now with which to lower the pour point of the product, lengthen its life, reduce its tendency to sludge, inhibit corrosion and give it an artificial bloom—everything but better prices.

NEW FACTOR: In the near future a new factor will enter into the compilation of motor-fuel stocks, namely, the quantity of gasoline owned by the federal Government and held at refineries and scattered points as aviation-fuel reserves.

SOARING: Daily crude production in Kansas passed the 194,000-bbl. mark last week. Some weeks ago, when the Illinois decline began, a Kansan predicted his state would be producing 200,000 bbl. daily by October 1. Maybe he called the turn.

POPULAR CHORD: Presidential Candidate Willkie twanged the purse strings of the oil industry in his Tulsa address. Loudest applause went to his remark about removing the heavy hand of Washington from petroleum.

FIELDS OF YESTERYEAR: For almost a decade we have heard of no floods of oil from flush fields in the Mid-Continent disrupting the market. The flush fields are still with us but are being sanely developed. Cooperation between the producers and state regulatory bodies works if given a chance.

FULFILLMENT: As much crude oil and oil products as you want, when you want it and where you want it. That is the oil industry's promise today. And it can make good on that promise.

FEATHERING HIS NEST? If President Cardenas is to be named the head of the Mexican Government's oil properties, as many contend, he might be accused of having feathered his nest. However, if Mexico continues unable to sell its production, the nest may not be so soft.

ENCOURAGING, BUT: An encouraging development of the month looking to next year is the reception being given to the 1941 cars. It would be more encouraging if the present 12 million barrels of excess gasoline did not represent a year's requirements for 700,000 new cars.

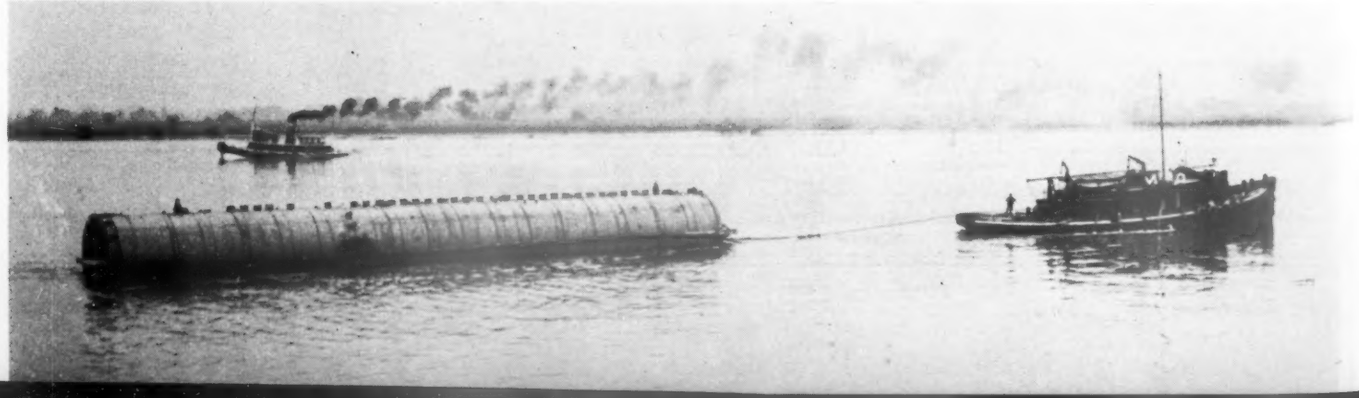
HOT COOLING: "High temperature" cooling of internal-combustion engines was adopted on three Illinois pipe lines during the past week. Though simple in principle and practice, this development is hailed by many as the most significant improvement in engine operation for many years.

BACKYARD POSSIBILITIES: Discouraged wildcatters who fail to find oil in wide-open spaces might try their own backyards. As evidence, there are Oklahoma City, Cement and Weleetka, Okla., and Severy, Kans., where townsite drilling campaigns now are under way.

PREPARING TO OPEN: Signs last week pointed toward the testing of the Devonian lime in the Louden, Illinois, field but the cheap-oil buyers need not expect a Roman holiday. The field's largest operator has made an agreement with the independents to develop the pool on a conservation basis with 20-acre spacing.

STEEL TOWER TOWED 170 MILES TO REFINERY . . .

An ocean-going tug tows Tide Water Associated Oil Co.'s newest refining equipment, a 300-ton fractionating tower, up the Atlantic Coast and through New York harbor, to the company's refinery at Bayonne, N. J. This is the largest piece of refining equipment ever delivered in one piece by water transportation



Integration: Key to Efficiency In the Petroleum Industry

By JOSEPH E. POGUE
Vice President, Chase National Bank*

According to the author . . .

JOSEPH E. POGUE

● It is a fact worthy of serious consideration and study that in a modern industrial nation, faced with a defense emergency of unknown gravity, the economic pattern of a leading and vital industry is threatened with disruption by government action. Integration is the economic mechanism under challenge; the Department of Justice is the agency of the Government that has raised the issue in the form of a proposed antitrust suit; and the highly essential petroleum industry, particularly the strategic pipe-line division, is under fire. It is only natural, therefore, that answers to these questions should be of interest: What is integration? Why has the petroleum industry assumed this form? What are its economic consequences and are they, on balance, advantageous or otherwise? Why is integration under attack and what is the true origin of the complaints against it? Does integration encourage competitive abuses, and, if so are they functional or organic? And, finally, what should be done about this whole matter?

THERE are two types of integration, vertical and horizontal. The first is a linking of successive stages in the economic process under one management; and the second, a combination of similar units at one stage of economic activity. The two types are fundamentally so different that the term "integration" for present purposes is limited to the vertical form.

Integration and size are not synonymous, despite popular confusion in the use of these words. Integration is a matter of structure and not a function of size. While integrated companies are usually larger than nonintegrated enterprises, there are many of the latter type which exceed in magnitude some of the former. Numerous small companies have developed the integrated form, but within the integrated classification there is a vast difference in size, for several of the largest enterprises are a hundred times as great as the smallest.

Although not dependent upon size, integration displays a wide range of variation in degree. There are numerous entirely nonintegrated companies, many units possess the pattern of integration in various stages of development, but only a few are practically self-contained in all four departments of the business—production, transportation, refining, and marketing. Furthermore, a continuous change is under way in the structure of the individual units and rarely is the direction of change from a higher to lower degree of integration. As it now stands, the oil industry is composed of companies grading in size from very small to very large and ranging in structure from nonintegrated to highly integrated. Thus in the oil business there is a complex six-way type of competition between large and small and integrated and nonintegrated enterprises with all their permutations and gradations. Since most organizations are but partially integrated, even the largest of the so-called integrated enterprises must engage in purchases or sales to balance its position at several economic as well as geographic frontiers in the various stages of the process from well to consumer. Most of the questions which have arisen concerning integration have developed around the terms and conditions of exchange at these points. It is not integration per se but the performance of integration at its boundaries that is the point at issue by those who attack the mechanism.

Why Has the Integrated Form Developed in the Oil Industry?

Integration in the oil business is the product of a long evolution. The first move toward the development of this form came with the invention of the oil pipe line, but up to some 30 years ago the salient feature in the expansion of oil companies was lateral growth. The first World War, coupled with the secular trend in demand, brought a raw-material scarcity which prompted the existing units to form vertical combinations to assure continuity of access to raw material, on the one hand, and to markets, on the other. Refining companies sought producing properties and marketing facilities; producing companies built refineries, which in turn entailed the development of distributing facilities. And throughout the entire evolution, refining interests found it necessary to develop their own specialized systems of transportation as suitable facilities were not available in the outside economy.

In short, the prime cause for the development of the integrated pattern was the simple economic motive for finding means to reduce the hazards in a speculative enterprise by equalizing the risks inherent in the separate departments of the business, after the analogy of crop diversification in agriculture. The trend toward integration was enhanced by certain technological features of the industry, such as the liquidity and inflammability of the materials which practically necessitated special forms of transportation; the volume of commodities involved which induced the application of mass-production principles; the joint-product nature of the processed output which required the development of new markets for the unwanted fractions; and the need for reaching the consumer at manifold points of utilization with small deliveries, which prompted specialized marketing facilities. In fine, integration is the resultant of the impact of a wide range of factors—economic, financial, and physical—which have made inevitable the development of this convenient operating pattern for utilizing the petroleum resource.

It might be going too far to say that integration is an absolute necessity in the operation of the oil business, but it is hard to see how the industry could function efficiently without the integrated form. The Supreme Court long ago recognized integration as a "facility of industrial progress" when it commented upon the findings of a lower court in the case of United States v. United States Steel Corporation (1920) as follows:

> ". . . they (the judges of the lower court) underestimated the influence of the tendency and movement to integration; the appreciation of the necessity or value of the continuity of manufacture from the ore to the finished product. And there was such a tendency, *and though it cannot be asserted it had become a necessity, it had certainly become a facility of industrial progress.* There was, therefore, much to urge it and give incentive to conduct that could accomplish it. From the nature and properties of the industry, the processes of production were something more than the stage and setting of the human activities. . . ." (Author's italics.)

What Are the Economic Consequences of Integration?

The economic consequences of integration are in part implicit in the causes that gave rise to its evolution and in part additional. Firstly, integration reduces the risk and therefore gives continuity and stability to an activity inherently highly speculative, thus enhancing the credit standing and access to capital necessary for expansion. Secondly, integration permits management to view the entire industrial operation as a single problem, resulting in a planned coordination of parts that could not be achieved effectively by the give and take of separate and uncoordinated functions. Thirdly, integration is particularly adapted to bearing the brunt of the rapid depletion of individual sources of supply and the obsolescence of technical facilities in an industry so highly industrialized as oil. Fourthly, integration is especially well suited for directing the efforts of research to strategic points in the productive cycle, thus accelerating the growth of technology which has proved so effective in the oil industry. Fifthly, integration fur-

*An address delivered before the National Petroleum Association at Atlantic City, Sept. 19, 1940.

thers the conservation objective by bringing the interest of a large portion of the industry into focus upon the adequacy and efficient utilization of the raw-material supply. And sixthly, the existence of the integrated form is fortunate because of its serviceability in mobilizing the petroleum resource for emergency requirements and maximizing its application to problems of national defense, a qualification evidenced by the interest of the National Defense Advisory Commission in delaying antitrust action pending study of its bearing upon the preparedness effort.

Since these factors involve cost-finding factors, it logically follows that the integrated form has resulted in lower prices to the public than would have been possible without it, if indeed the industry could have grown to its present size and serviceability if not unified by the integrated pattern.

If integration, then, is an effective productive form, why is it repeatedly threatened and attacked? This question is important, for not only have there been recurring attempts to legislate this structure out of existence—the Bierman bill, the Harrington bill, the Gillette bill as a few examples—but lately the effort proposes to utilize another technique, substituting for the passage of a new law an antitrust suit seeking to find integration to be in contravention of an existing law.

What Are the Origins and Nature of the Complaints Against Integration?

Integration has long been and still is the object of complaints on the part of special interests, and these complaints have given rise to both legislative and judicial proposals leading to either a destruction of integration as a permissible form in the oil business or else to a modification of the manner in which it functions. These complaints, and their resulting pressures for change, have a number of origins. Some of them arise from a confusion between bigness and integration, in consequence of which the latter is attacked whereas the former is the object of disaffection. Others issue from marginal operators who are so poorly positioned that they are unable to prosper in the competitive struggle. Still others emanate from those who favor change in existing institutions on the theory that capitalistic processes are incompetent and should in general be modified or destroyed. All these objections, however, which fall in the category of false diagnoses, need cause less pause than a much more realistic class of complaints that have to do with the manner in which integration functions in specific cases. It is this category of complaints, arising from the incidence of integration upon special groups, that needs further examination.

While the realistic group of complaints and their consequent pressures for change are diverse in apparent nature and cover a wide range, yet they all have to do primarily with what may be termed intermediate prices and to a minor extent with intermediate practices. Dissatisfaction does not arise at the points of contact between the industry and the public or between the petroleum industry and other industries, but only at the boundaries between the various phases of the business, thus generating problems of a purely internal character. The general idea running through the entire complex of confusing details, though not often clearly outlined, is that the integrated companies enjoy certain advantages by virtue of their strategic position in the flow of oil from the well to the consumer which permits them to influence the prices at which nonintegrated operators, whether producers, refiners, or marketers, must transact part of their business. These prices, it is felt, are biased in favor of the integrated companies and are therefore damaging to companies not organized in the integrated pattern. The attack is not directed against integration itself, but against the manner in which it operates in specific instances. This distinction, however, frequently becomes lost in practice and thus a movement is started toward the destruction of integration through segregation of the industry into its separate functions.

What Is the Significance of the Charges Against Integration?

We have attempted to show that, by a process of adaptation to the economic job to be done, integration is a natural evolution in the oil business which leads to greater industrial progress and serviceability to the public than could be gained without it; but that in spite of these advantages there have been recurrent and increasing efforts to destroy or modify integration first through legislation and now through judicial action. Integration is not on trial in this address, nor is this the place to pass judgment upon the validity of the charges directed against it. A more useful service can be rendered if the charges can be reduced to their fundamentals and the way pointed to a correction of the conditions that, whatever their nature or validity, are inexorably leading to the endangerment of the integrated form.

The whole area of controversy can perhaps be clarified by reducing the attack on integration to its salient points, as may be done by the omission of all nonessentials. The opponents of integration, in effect, say: Integrated companies exert an indirect influence over the cost of crude oil to others that tends to restrict the profits of the nonintegrated refiner; integrated companies charge a tariff for pipe-line transportation that may exclude the small refiner from this service; and integrated companies through differential margins to various classes of jobbers and dealers give preferential treatment to favored outlets. These claims imply the arbitrary use of power over intermediate prices as contrasted with price-cost relationships established by freely acting, bilateral competitive forces.

The proponents of integration recognize that the area of intermediate prices is involved in many complexities; that the plane of operations in this zone must of necessity give rise to numerous complaints; and that the focus is such that abuses are bound to be exaggerated in their total incidence and importance. Many of the difficulties must be ascribed to growing pains in an active and dynamic industry, while the grounds for dissatisfaction are in course of alleviation, if not eradication, by the ccurse of orderly change. The margin of price over cost in crude oil, for example, is narrowing as a result of advancing levels of costs, and pipe-line tariffs have been declining for some time. The proponents of integration feel, further, that the social and economic advantages of integration are so great that it would be an irremediable and disastrous error to destroy the mechanism in order to remove the cause for complaints at its competitive frontiers; rather would it be desirable to allow time for internal adjustments to these ends.

So great, however, is the pressure for quick action, which could only result in disruptive consequences, that it might be desirable to speed up the processes of orderly change by giving more concerted attention to the points at issue. Thus the focal points of irritation could be eradicated by encouraging more frequent and smaller changes in crude-oil prices, in closer harmony with costs and realizations; prompt adjustments in pipe-line tariffs in all cases where previous alterations have not brought postings into reasonable conformity with costs, considering risks; and the introduction of a system of quantity discounts to jobbers and dealers based upon real differences in costs, so as to obviate any hint of preferential treatment to any class of outlets.

Conclusion

The integrated pattern is organically sound and an extremely effective if not indispensable form; but the manner in which it has operated is the source of sufficient dissatisfaction to create a problem requiring attention. The trends under way, especially if fortified by the measures suggested here, followed perhaps with the periodic publication of departmental profits and losses, should go far toward removing any possible objections to the functioning of the integrated mechanism and thereby insure its preservation in our economy.

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Humble Practically Assured of Government Toluene Contract

CONSTRUCTION of a large plant by Humble Oil & Refining Co. on the Gulf Coast for production of nitration grade of toluene from petroleum gases is practically assured. The company has submitted optional proposals to the Government and has received a "speedup" letter from the National Defense Advisory Commission, which is the practical equivalent of a contract, leaving only details to be negotiated.

The form of contract submitted by Humble is similar to several contracts already entered into by the Government for the manufacture of munitions. Under such a contract, Humble would erect and operate a government plant at cost plus a fixed management fee, or on the same basis would operate a plant previously constructed by the Government. The fixed management fee and charges to cover indirect expense not susceptible of appraisal in advance are not stated in Humble's offer, but are left open for determination by the Government in keeping with its policy in such matters.

In announcing the preliminary status of the negotiations between the Humble company and the Government, The Lamp, Standard Oil Co. (New Jersey) publication, said that a subsidiary operating company recently delivered for testing purposes two tank cars of nitration-grade toluene produced synthetically. Location of the plant, which it is understood would be constructed, supplied and operated by the Humble company, has not been disclosed. Operating conditions, however, indicate that the toluene plant will be built in the vicinity of Humble's Baytown, Tex., refinery where refinery gases would be available in sufficient quantity. Harry C. Wiess, president of Humble, is spending much time in Washington in negotiations.

●

Michigan Has Potential New Field

SAGINAW, Mich., Sept. 17.—A potential new field was reported today in Osceola County, Michigan, where Weber Oil Co., Bay City, Gabel test, NE NE SW Section 31-18n-10w, Lincoln Township, Osceola County, has 1,200 ft. of oil and water in hole. The well, north of Reed City, is 25 miles from closest production in Sherman-Temple field and is result of test getting show last year 2 miles southeast of present location. Present depth is 3,629 ft. with operator planning effort to shut off water horizon. Supposed pay is at 3,625-29 ft. in dolomite Dundee. The well got a showing of oil and water between 3,528-39 ft., near Dundee top, the hole filled 400 ft. with oil and water, and was drilled deeper, filling 1,200 to 1,500 ft. overnight.

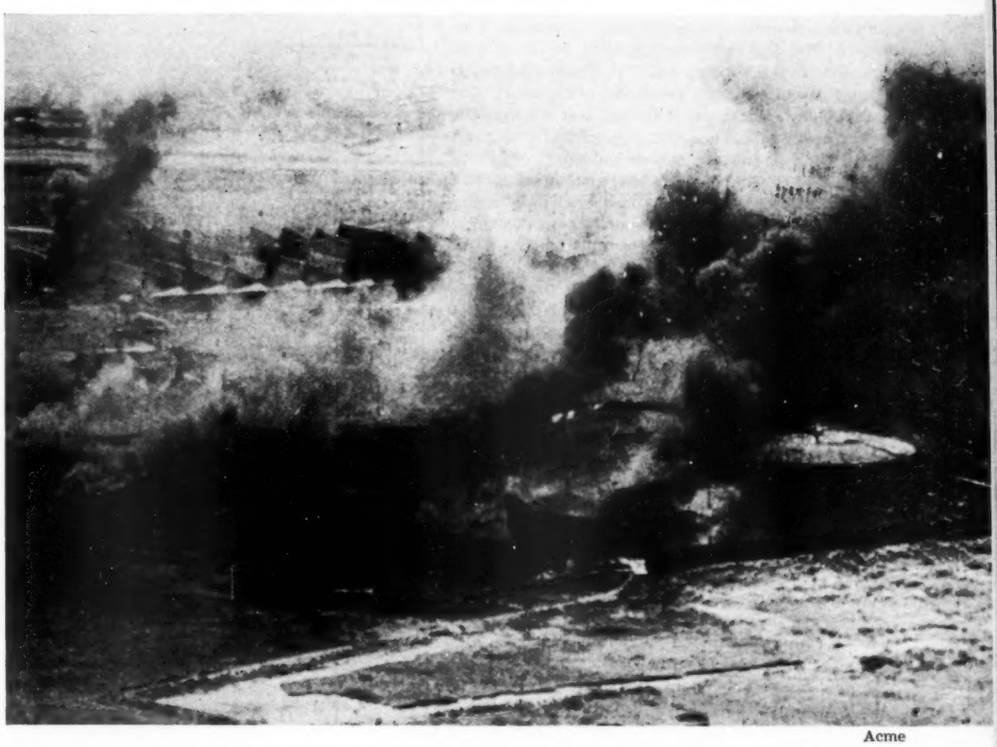
Britain's Blockade Intensifying Oil Famine in Europe

By J. P. O'DONNELL

NEW YORK, Sept. 17.—Steadily accumulating evidence points to a widespread and an increasingly intense famine of petroleum in Continental Europe as a result of Great Britain's tight blockade. Stocks of gasoline and other petroleum products are reported to have reached critically low stages in several countries and the demands on the two European nations which produce more oil than is required for domestic consumption—Rumania and Russia—exceed all possibility of fulfillment.

In addition to the inability of these two countries to meet the demands of the others, there is evidence indicating that production there is on the decline. Early this year it was reported that the output of Russia's important Baku district, which supplied 75 per cent of the country's production, had declined and in the first 2 months of this year only 104 out of a scheduled 225 wells had been completed. If the drilling rate were to continue at this level through the remainder of the year, the Soviet program would fall fully 70 per cent cent below its goal. In April Rumanian production dropped 3 per cent below that of March.

There is little evidence, however, to support the conclusion that the widespread oil shortage has affected or will affect the operation of the German war machine. Before the war it was reliably estimated that Germany was in position to supply 60 per cent of her annual domestic consumption of approximately 26,000,000 bbl. of gasoline. Since then she has restricted domestic consumption, increased her synthetic-plant capacity and obtained additional quantities of oil from Russia and Rumania.



Acme

Smoke pours from oil tanks fired by German air raiders operating over England. This photo is from the German "war newsreel" and shows for the first time German bombing operations over England

Russia Supplying Germany

Early in August it was reported that tanker shipments of Russian oil were being made from the Latvian port of Riga to a German Baltic port at the rate of 150,000 tons or more than 1,000,000 bbl. per month. Last week it became known that Russia was sending additional supplies of oil to Germany from the Caucasian fields through the Black Sea, up the Dneiper River to Kiev in the Ukraine and thence by the Bug Canal to Brest in Poland, where it was loaded on tank cars. Furthermore, the armistice with France gave Germany the right to requisition privately owned French tank cars and this right was recently exercised by the Nazi high command in order to speed shipments of Rumanian oil.

Before the war began Germany had taken steps to reduce domestic consumption to a minimum and to conserve supplies for military operations. These steps included the offering of subsidies ranging from 600 to 1,000 marks to induce civilians to convert gasoline-consuming vehicles to gas and, in the first weeks of the war it was reported that the great bulk of privately owned passenger cars and motor trucks were retired from service. Thus between curtailment of consumption and expansion of imports, Germany seems to be adequately supplied with petroleum at present.

Conditions elsewhere in western Europe, however, are rapidly approaching the critical stage as the following summaries indicate:

The Netherlands.—The number of buses in use has been reduced, certain classifications of taxis and private cars are excluded and a freight commission has been formed to eliminate trips of empty trucks. Thousands of wood-gas generators have replaced gasoline engines. Harvesting is reported to have been retarded by the lack of fuel for tractors and housewives have been asked to conserve kerosene by limiting its use for cooking and water heating.

Norway.—In normal times, Norway obtains two-thirds of her petroleum supplies from Iran, the United States and the Netherlands West Indies. Complete cessation of imports from those countries has resulted in drastic limitations on coastal traffic, highly important in the country's economic system because of the difficulties of internal traffic, in order to conserve fuel oil.

Sweden Raises Tax

Sweden.—The tax on gasoline was raised in July from 4 to 21 ore per liter and on gas oil from 2 to 16 ore while a surtax of 21 ore has been levied on all gasoline in storage. Sweden, which formerly obtained the bulk of her petroleum supplies from the United States, is now depending on Russia and recently completed a trade agreement by which the Soviets will supply the Scandinavian nation with oil and grain.

Stocks of oil were reported to be down to 3 months' supply in Sweden before consummation of the agreement with Russia. In a step to conserve these low supplies, housewives were asked to limit the use of hot water to 2 days a week. Fishing, one of Sweden's most important industries, has been seriously handicapped by the lack of bunker oil for trawlers.

Denmark.—In Denmark, another nation that was dependent on outside sources for supplies, two-thirds of the automobiles are reported to have been laid up and the use of those remaining has been restricted. In drastic efforts to conserve supplies, requirements have been reduced to one-fifth of normal.

Internal Consumption Curtailed

Switzerland.—Restrictions have been placed on internal consumption in order to conserve declining stocks and automobiles leaving the country are permitted to carry only 10 liters (approximately 2⅝ gal.) of gasoline. Gasoline and fuel-oil exports are forbidden. Prior to the war Switzerland obtained 30 per cent of her oil supplies in the United States, but also obtained 25 per cent from Rumania, a source that is still open.

Belgium.—All motor cars are required to be registered and only those engaged in essential service are permitted to operate. Belgium is another country which was principally dependent on the United States for oil and in 1939 she obtained 35 per cent of her supplies in this country.

(Continued on Page 75)

Tuscaloosa Discovery Heightens Oil Interest in Mississippi

By GEORGE WEBER

DISCOVERY of the first commercial oil in the Tuscaloosa formation in Mississippi marks another important stage in that state's development. The Union Producing Co.'s No. 1 Powell, located in the Tinsley field of Yazoo County, is being completed in a saturated oil sand of Tuscaloosa age. A recent drill-stem test showed the well flowing an average of 585 bbl. daily through ⅝-in. chokes after the section had been perforated at 6,110-15 ft. The crude is of higher gravity than that from other formations at Tinsley, averaging 42° A.P.I. corrected A shake-out test on the latest production showed 0.3 per cent mud and no water.

The recent discovery is not the first indication of oil in the Tuscaloosa. Because of its commercial production, however, it has sharply increased interest in that formation, and may be expected to result in a more thorough exploration of the entire Cretaceous section.

During the past year most of Mississippi's wildcat activity has been directed to three formations of the Upper Cretaceous. In the order of their stratigraphic position they are: the Tuscaloosa (the basal Upper Cretaceous formation), the Eutaw and the Selma chalk. Sands in the two upper formations have been proven for production in the Tinsley field, and the Eutaw is producing in the Pickens field.

While productive possibilities of Tuscaloosa sands have been generally recognized, the success in finding oil in the Selma chalk and Eutaw formations has caused these upper sands to be the primary objects of interest up to the present. Many wildcats in Mississippi and Alabama have drilled into the Tuscaloosa formation, but most of them have stopped short of drilling the entire Upper Cretaceous section. Failure to drill through the Tuscaloosa in recent Mississippi wildcats may be largely attributed to the cooperative basis on which many such tests were drilled. Wildcats have been financed to be carried to arbitrary depths which in most cases did not allow penetration of the entire Tuscaloosa formation.

The enhanced interest in the Tuscaloosa formation may well cause the deepening of several such tests, and subsequent wildcats may be expected to be carried deeper than previous tests.

Tuscaloosa Formation

The Tuscaloosa formation outcrops in South Tennessee, Northeast Mississippi, and across Alabama into Georgia. It dips to the south-southwest and is present throughout most of the subsurface of Mississippi south of its surface outcrop. The formation is not present in the extreme west-central edge of the state in Sharkey and Issequena counties. It is within easy reach of the drill throughout the central section of the state, where exploration of the Upper Cretaceous has been generally concentrated.

The formation was first given the name Tuscaloosa by Smith and Johnson[1] in 1887, for the city and river now known as the Warrior River, in Alabama. Dr. E. A. Smith, Alabama state geologist, later added information on the formation. An early study of the Tuscaloosa was made by the paleobotanist, E. W. Berry,[2] who found that most of the fossil plants in the Upper Cretaceous outcrops in Alabama, occurred in the Tuscaloosa formation.

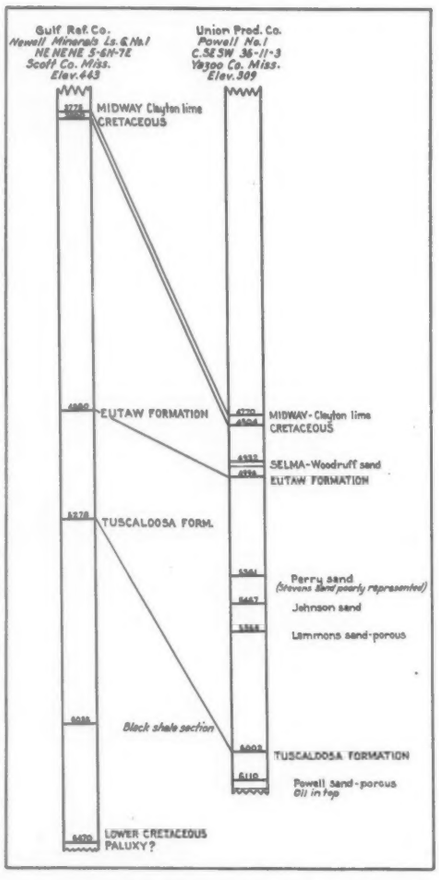


Fig. 1—Upper Cretaceous section penetrated by wells in the Tinsley field and by Gulf's No. 1 Newell Minerals Lease in Scott County, Mississippi

Mr. Berry reported that the Tuscaloosa "outcrops as a belt of varying width along the southwestern border of all four of the physiographic divisions of the southern Appalachian province. These divisions are, in order from northwest to southeast, the Interior Lowlands, the Cumberland Plateau, the Appalachian Valley, and the Piedmont Plateau. This area of outcrop which amounts to about 6,500 sq. miles is almost exactly lunate in outline, one horn terminating at the Tennessee boundary in northeastern Mississippi and the other near Montgomery in East Central Alabama. Its length is about 250 miles and the chord of the arc is almost exactly at right angles with the axis of the Appalachian Mountains."

Materials in the Tuscaloosa are predominantly sandy, with sands usually light in color, cross bedded and micaceous. In places along the outcrop, particularly to the north, the formation contains many gravel and pebble beds made up of approximately equal amounts of well-rounded quartz and angular chert. Red and maroon mottled clay shales are common in the Tuscaloosa formation.

It contains disconnected and interbedded lenses of argillaceous material and lignite seams are present at various levels. Mr. Berry further reports that clays in the lower part of the formation are more extensive and more massive than in the corresponding Upper Cretaceous from Cape Cod to Texas, excepting in the Raritan formation of Middlesex County, New Jersey. Although they represent nonmarine sediments, marine waters were nearby during the deposition, since temporary incursions of glauconite and gypsum have been found.

A later collaboration of this finding is the recently discovered marine section of the Tuscaloosa, made up of gray shales and some glauconitic sands sparsely fossiliferous, found in Chiltin County, Alabama. It appears that the marine section of the Tuscaloosa occurs in the lower one-third of the formation. A number of geologists have correlated this Alabama outcrop section of marine Tuscaloosa with the fossiliferous dark shale section found in wells in South Alabama and in Central and South Mississippi which occurs several hundreds of feet below the top of the Tuscaloosa red beds.

The strike of the Tuscaloosa beds is parallel with the shoreline of the old land mass which they skirt and the dip corresponds to the Cumberland peneplain. At the outcrop in western Alabama the estimated thickness of the formation is 1,000 ft., but it thins to the north and is approxi-

TABLE 1—CORRELATION OF TUSCALOOSA WITH FORMATIONS TO THE WEST

Texas **Austin**	South Arkansas and North Louisiana **Tokio**	Mississippi **Eutaw**
Unconformity	Unconformity	Unconformity
Eagle Ford (with Lewisville sandy facies at base.)	**Centerpoint** (Woodbine of Southwest Arkansas, downdip interfingers into Eagle Ford in North Louisiana.)	**Tuscaloosa** (red shales and sands, marine black shales, fossiliferous sands with basal gravel.)
Major unconformity	Major unconformity	Major unconformity
Woodbine (of Lower Cretaceous age, transitional downward into Grayson marl.)	**Woodbine not present** (beds of Eagle Ford age in South Arkansas rest upon Washita, Fredericksburg, Paluxy, or upper Glen Rose at various places. The Eagle Ford of North Louisiana may rest on Fredericksburg, Paluxy, upper Glen Rose, lower Glen Rose, or Travis Peak, depending upon locality).	**Woodbine not present** (Tuscaloosa with a widespread basal gravel may rest on beds ranging in age from Lower Cretaceous to Paleozoic.)

[1] U.S.G.S. Bulletin 43, p. 95, 1887.
[2] Professional Paper 112. Edward Wilbur Berry, "Upper Cretaceous Floras of the Eastern Gulf Region in Tennessee, Mississippi, Alabama, and Georgia."

mately 270 ft. thick in Northeast Mississippi.

There is a difference of opinion among geologists as to the exact age of the Tuscaloosa compared with the Upper Cretaceous formation of Texas, South Arkansas, and North Louisiana. Some consider that lithologically it correlates with the Woodbine in East Texas because of a main unconformity below both the Woodbine and Tuscaloosa, and because of evidences of vulcanism during the deposition of both formations, shown by the presence of volcanic ash.

Another group of geologists, after studying outcrops of both formations, place the unconformity above the Woodbine in East Texas and correlate the Tuscaloosa with the Eagle Ford formation in Texas. Ammonites, pelecypods, and ostracoda have been found in the marine black shale section of the Tuscaloosa, the top of which is several hundreds of feet below the top of the Tuscaloosa red beds, which fossils have been identified as species occurring in the Eagle Ford formation in Texas.

W. C. Spooner, consulting geologist, gives the correlation of the Tuscaloosa with formations to the west as shown in Table 1.

The relation in the Gulf Coastal area, according to Mr. Spooner, indicates that the Eagleford and its correlatives transgressed over an erosion surface developed as Lower Cretaceous beds. The Woodbine of East Texas which lies below the unconformity at the base of the Lewisville properly is considered a regressive deposit of Lower Cretaceous age which downward is transitional with out any marked sedimentary break into the Grayson marl of Washita age.

Tuscaloosa Exploration

Although a large number of wildcat tests have been drilled into the Tuscaloosa red beds in Mississippi and Alabama, relatively few have drilled entirely through the formation. On only four defined structures with established closure has the Tuscaloosa been completely drilled, although other wildcats have penetrated the formation on what may later prove to be structures with closure in the formation. The four structures cited above are: the Tinlsey dome, the Jackson dome, the Hatchetigbee anticline, and the Quitman fault structure.

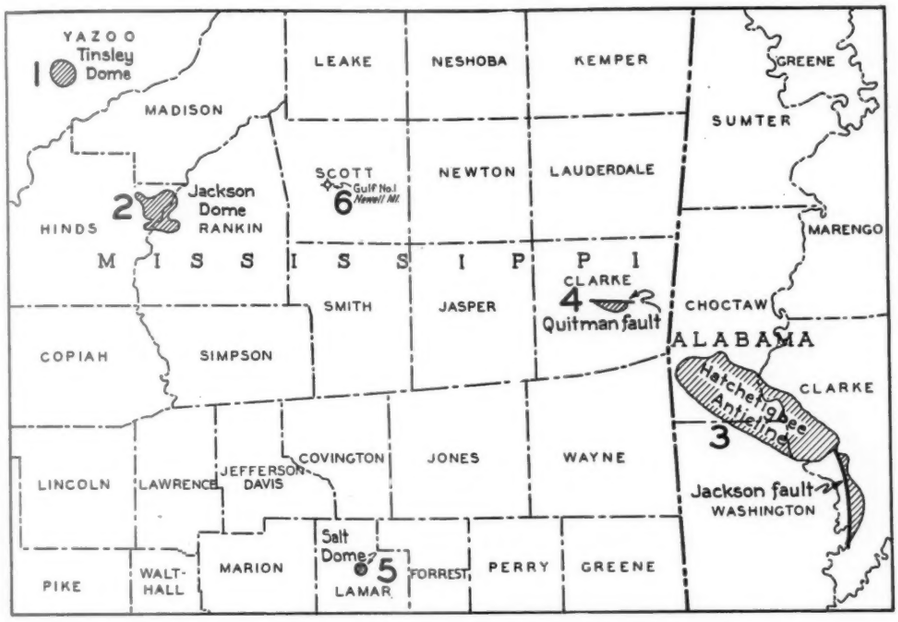
The Tinsley dome in Yazoo County, West Central Mississippi, is the only structure currently proven productive in the Tuscaloosa. Two wells in the Tinsley field stand out in importance in this respect. Of five tests drilled into the formation, the Union Producing Co.'s No. 4 Perry and No. 1 Powell are of prime importance.

In March 1940 the No. 4 Perry tested a heavy, noncommercial oil of 12° A.P.I. gravity in a Tuscaloosa sand body. The sand was drill-stem tested at 5,545-90 ft., using ⅜-in. top and bottom chokes. With the testing tool open 10 minutes, 560 ft. of heavy oil and 720 ft. of oil and salt water were recovered. Bottom-hole pressure was reported at 500 lb. per sq. in. The well was later plugged back and completed as the discovery well in the Perry sand of the Eutaw formation.

The most important Tuscaloosa test, in view of its current completion as a producer is Union Producing Co.'s No. 1 Powell. Fig. 1 shows a Schlumberger log of the Cretaceous section in the well. The Tuscaloosa was topped at 6,002 ft. and a porous sand with oil saturation in the top was encountered at 6,110-55 ft.

A drill-stem test made at 6,097-6,119 ft. showed recovery of 130 ft. of clean oil and 120 ft. of oil and mud in 9 minutes, using ⅜-in. chokes and recording a working pressure of 11 lb. During the test the seat slipped to 6,111 ft., and perforations in the tool are believed to have been partially sealed off, accounting for the relatively low recovery of fluid.

A second drill-stem test was made at 6,107-29 ft., using the same sized chokes and recording a working pressure of 18½ lb. Recovered were 800 ft. of clean oil, 2,450 ft. of oil and salt water, and 370 ft. of salt water. Operators set 7-in. casing to 6,122 ft., perforated with nine shots at 6,118-22 ft., and squeezed with 380 sacks of cement to shut off bottom water. After drilling out to 6,117 ft., they perforated at 6,110-15 ft. with 18 shots and the test failed to show production. Swabbing to 5,800 ft. showed no fluid rise in the hole, so the section was again perforated at 6,110-15 ft. Following the second perforation, the well flowed 632 bbl. in 26 hours on a drill-stem test using ⅜-in chokes. Pressure at the top of the hole was 220 lb.



Map of Central Mississippi and a part of Alabama showing the location of structures in which the Tuscaloosa formation has been tested. Legend: (1) Tinsley dome, first discovery of oil in the Tuscaloosa. (2) Jackson dome, Tuscaloosa missing on top, flank shows of oil in igneous intrusive rock. (3) Hatchetigbee anticline, shows of oil in the Tuscaloosa formation. (4) Quitman fault structure, show oil in Eutaw, no oil shows in Tuscaloosa. (5) Midway salt dome, 100 ft. of asphaltic sand correlated as Tuscaloosa sand. (6) Deepest wildcat in Mississippi, 10,202 ft., Gulf Refining Co., Newell Mineral Lease Co. No. 1, no shows in Tuscaloosa

Other Structures

The Jackson structure shows the Tuscaloosa formation missing on top. Flank wells have been drilled into the Lower Cretaceous. In one such test, Union Producing Co. reports a show of oil in intrusive igneous rock.

The Robinson & Greer No. 1 Longbell Lumber Co., drilled on the Hatchetigbee anticline in Choctaw County, Southwest Alabama, was drilled into the Tuscaloosa and shows of oil in Tuscaloosa sands were reported.

The Quitman fault structure in Clarke County, Southeast Mississippi, was also explored in the Tuscaloosa, but although oil shows were found in the overlying Eutaw formation, none were encountered in the basal Upper Cretaceous.

On the Midway salt dome of Lamar County, South Mississippi, the Sun Oil Co., in No. 4 Tally, encountered about 100 ft. of asphaltic sand which sand by correlation is a basal sand of the Tuscaloosa formation.

The E. L. Martin No. 1 Newell Minerals Lease, later taken over and deepened by Gulf Refining Co., also failed to find Tuscaloosa oil shows. The test is located in Section 5-6n-7e, Scott County, Central Mississippi. Although the wildcat ran high, the structure, located by geophysics, is not yet established. Fig. 1 illustrates a typical section of the Cretaceous as logged in that wildcat.

Defense Commission Delivers Report

WASHINGTON, D. C., Sept. 17.—The National Defense Commission yesterday delivered its report on the petroleum antitrust case to the Department of Justice. Although its decision has not yet been made public, indications are that the commission did not request that the suit be abandoned, but it pointed out that divorcement would seriously hinder national defense. Since the commission did not take a positive stand, decision on whether to bring the suit remains with Attorney General Jackson.

Oil Men Attend Conference

A group of prominent oil executives met with Secretary Ickes and members of the Petroleum Conservation Division today in a secret conference believed to pertain to the national-defense program or pending legislation for federal regulation of oil production. Department officials and oil men attending stated that they were not in position to discuss the meeting in any way. It was recalled, however, that Secretary Ickes has suggested that the defense program might call for setting up a committee of the industry to cooperate with the Government somewhat similar to that working with the fuel administration during the World War. There is also the possibility that the conference may have discussed a modification of the Cole bill to provide limited federal control of production.

STATE CAPITALS...

TEXAS

PROTESTS AGAINST CURRENT ALLOWABLES in the K.M.A. and Hull-Silk fields of North Texas will be heard at a hearing set for September 20 by the Railroad Commission. In a petition recently filed by 21 of the fields' operators they contended that the new quotas as set in the order for September, October and November did not represent a fair share of the total allowable for the state. It also was pointed out that no hearing had been held since August 1 at which the petitioners could present facts to justify higher allowables.

Enforcement of the orders against the wells of 3,000 ft. or more depth would be unreasonable, it was alleged, and restrict them below wells of comparable depth in other fields. The order cut the basic quota for K.M.A. from 36,697 to 36,087 bbl. effective September 1 and raised Hull-Silk from 8,211 to 8,677 bbl.

A STATE-WIDE HEARING on the question of adopting a rule limiting the deviation of wells drilled in various Texas fields was called by the Railroad Commission for September 23. The hearing was ordered following a petition by Arkansas Fuel Oil Co., which proposed that a special permit be required for directional drilling beyond certain limits. Rules of the commission now are virtually nonexistent on the question, although a construction placed on the oil and gas laws generally has been that a well must be bottomed as nearly as possible under its surface location. In Conroe, Plymouth, and South Esperson dome special field rules limit the extent of directional drilling, the per cent deviation varying according to the distance the well is located from the lease line, i.e., a well located 500 ft. from a lease line is limited to 5 per cent deviation, while one 300 ft. from a line is limited to 3 per cent.

TEXAS' DAILY ALLOWABLE increased 11,967 bbl. last week to a daily average of 1,344,338 bbl., or 24,038 bbl. in excess of the Bureau of Mines estimated market-demand figure, the Railroad Commission reported Saturday. Deduction of underproduction, which is estimated to approximate 2.5 per cent, however, would place the actual daily flow at 1,310,729 bbl. Every proration district except East Texas shared in this week's allowable gain.

The increase was due mainly to exemptions from shutdowns and other orders boosting quotas and in part to addition of 146 new wells to the schedules. While the average daily permissible rose 11,967 bbl., the basic allowable gained only 1,891 bbl. to 1,661,204 bbl., indicating much of the rise was due to additional shutdown exemptions.

Following is a list of the fields raised last week, with the increases in daily average figured for those fields where shutdowns were lifted:

Field—	Old Allowable	Raised to
Rogers & Rogers	3,658	4,313
O'Hern	3,961	5,136
Warren, Wichita	78	200
Damon Mound	240	343
Walnut Bend	3,623	5,175
Bonita	490	700
Shearer	549	1,153
Pecos low gravity	479	793
Pecos high gravity	729	1,416
Masterson	126	264
Emperor	664	949
Ganado	226	322
Baldwin	164	235
Lewis Steffens	1,740	2,486
McCamey	9,450	13,500

Allowables Saturday by districts and the changes from a week ago were, in barrels: Southwest Texas, 230,566, up 909; Gulf Coast, 204,839, up 2,398; East Central, 78,700, up 165; East Texas, 367,932, no change; West Central, 52,133, up 4,182; West Texas, 214,864, up 2,980; North Texas, 109,381, up 1,406, and Panhandle, 85,923, up 122.

The STATE-WIDE GAS-PRORATION HEARING was set by the Railroad Commission for September 20 for hearing evidence upon which to base the October gas-proration schedule. As the state's oil-proration order extends through October and November, no hearing is expected to be called this month.

DRILLING ACTIVITY IN TEXAS picked up last week compared to the preceding one, the Railroad Commission reported on Monday. The total number of permits issued was 178, a gain of 34 over the previous week, to bring the year's total number of permits issued to 8,238. North Texas led the state with a total of 37 new locations issued of which 19 sites were staked in Archer and Wichita counties. The Gulf Coast recorded 18 locations of which five were in Wharton County while three new permits were granted for the East Central Texas district.

In West Central Texas there were 22 locations, with 9 being in Jones County; in West Texas 29 permits were granted of which 11 were staked in Ector County and 5 in Wasson field; Southwest Texas had a total of 34 permits granted of which 13 sites were staked in Jackson County; and in the Panhandle 7 permits were issued.

A STUDY OF TEXAS CRUDE OILS will be completed late in October, according to John E. Taylor, chief supervisor of the Texas Railroad Commission's Oil and Gas Division. The survey includes an analysis of every oil-producing sand in every Texas field. Designed primarily for national defense—to enable the state to advise the defense administration of the federal Government where any particular type of oil may be obtained and in what quantities—the survey will also be made available to the general public, Mr. Taylor said. Analyses of the oil constituted but a part of the comprehensive state-wide survey, which includes a map of every field in its relation to transportation facilities, towns, etc.

CALIFORNIA

THERE HAS BEEN SOME DISCUSSION in California during the past several weeks regarding the possibility of separating crude-oil production into two classes. This has resulted from the fact that gasoline stocks are abnormally high and will probably reach a much higher level during the forthcoming winter season if runs to stills continue at the present rate. Fuel-oil demand has risen to a very encouraging level and the consumptive demand for fuel oil, furnace oil and heating oil will result in a heavy production of gasoline and other refined products which will result from the refining of light crude oil to produce the fuel oil, furnace oil and heating oil. It has been suggested that production of heavy crude oil be stepped up as this grade of crude would yield a maximum amount of fuel oil and a minimum amount of lighter fractions. No action has been taken by the Conservation Committee with respect to this possibility but some definite action may be taken in the form of a suggestion in the not far distant future.

The present curtailment program is predicated on the assumption that crude oil and refined-oil products should be withdrawn from stocks during the summer season to permit a normal accumulation during the winter period with its restricted demand. The only difficulty now confronting the Conservation Committee is that the rate of production has prevented any withdrawals during the first 7 months of 1940 and by the time winter rolls around the reduction will be practically negligible unless something is done at once. The administrator and the committee are confronted with a serious situation and every effort is being made to correct conditions as soon as possible. The reduction in Japanese shipments has tended to disrupt the curtailment program due to the confusion that arose in connection with the aviation gasoline embargo and licensing of crude oil.

KANSAS

AN ORDER STAYING ENFORCEMENT of the Corporation Commission's proration order in the Hugoton gas field of western Kansas, pending a decision of the case in October or November, was issued last week by Judge F. O. Rindom of Stephens District Court. The order was effective as of September 6 when the case was argued in his court. Nearly 180 landowners filed the order, claiming the commission's proration plan would damage their holdings. Attempts by a previous commission to apply the first Hugoton proration order in September 1938 were frustrated by legal entanglements and litigation.

THE MARKET-DEMAND HEARING for determining Kansas' October crude-oil allowable is to be held at 10 a.m. on September 26 at Eldorado in connection with that city's celebration of the discovery of the Eldorado oil pool 25 years ago. The hearing will be held in the municipal auditorium, Theo A. Morgan, conservation director, announced.

OKLAHOMA

W. J. ARMSTRONG, chief proration officer, following a hearing on the South Burbank field last Friday, announced a recommendation that the allowable of the field be reduced will be presented to the Corporation Commission. A 10 per cent cut in the pool's allowable, cutting it from 7,797 to 7,018 bbl. daily, the amount of the reduction asked by the Carter Oil Co. as unit operator of the South Burbank field, will be recommended. Request for the reduction was put before the Corporation Commission at the recent state-wide allowable hearing, but was postponed when W. F. Eaton, assistant oil and gas inspector for the pool, asked that the Osage Tribal Council's views on the matter be heard.

In Friday's brief hearing, C. M. Richardson, petroleum engineer for the Carter in charge of the South Burbank pool, testified that in recent months bottomhole pressure had dropped markedly, and now is at 290 lb. as compared with its original pressure of more than 1,000 lb. Mr. Richardson also cited a continuing rise in the gas-oil ratio, pointing out that efficient operation of the field depends on keeping the ratio down.

ARKANSAS

AT ARKANSAS' STATE-WIDE HEARING to be held in El Dorado, Ark., on September 20 evidence will be heard for fixing the state's October allowable. In addition the Oil and Gas Commission will hear applications of the Arkansas Fuel Oil Co., G. H. Vaughn, Shell Oil Co., Inc., Southwood Oil Co., Sun Oil Co., and others, for the granting of additional acreage to drilling units for the purpose of allocating production of oil and gas to those units where (*a*) a well is drilled on a lease covering more than 40 acres, owned by one person, or by persons in moiety, (*b*) subsurface information gained by the drilling of a well on or near a lease covering more than the acreage originally nominated as a drilling unit indicates more productive area than that nominated and now assigned to the unit, and (*c*) the intent and purpose of Act 105 of the fifty-second general assembly could better apply in each and all of the state's flush pools.

The OIL AND GAS JOURNAL

PRODUCING REFINING NATURAL GASOLINE PIPE LINE

Published weekly by The Petroleum Publishing Company at Tulsa, Oklahoma

Part and Parcel

The National Defense Advisory Commission, before it makes a decision regarding the Justice Department's plan to force pipe-line divorcements, should familiarize itself with recent developments in the industry's transportation operations.

If it makes an investigation the go-sign will never be given in this latest plan of the Government to harass the oil industry and the prosecutors who are "all set" for the courthouse will continue to "set."

With no ballyhoo and no direction or aid from Washington, those who build and operate pipe lines, in one of the most active construction periods in the history of the industry, are making a major contribution to the preparedness plans of this country.

At widely scattered points throughout the United States the pipe-line gangs are at work. Before the year ends some 6,000 miles of new trunk lines will have been built, with more major construction in the offing.

Gathering systems this year will be connected to more than 20,000 new oil and gas wells. Hundreds of miles of existing trunk-line and gathering systems which now total nearly a quarter million miles will be reconditioned to better serve the constantly expanding petroleum and natural-gas industries and their customers.

The fact that pipe lines are an integral part of the petroleum industry and should never be separated from it was never more apparent than in recent months.

Lines have been extended to new fields throughout the oil country. Many of these fields are small and there are others whose output is not large due to proration restrictions. But they have their pipe-line outlets.

After millions had been spent in new lines and the looping of old lines to take care of the peak production of the Illinois basin, its output leveled off a few weeks ago and then started downward as fast as it had come up.

Pipe-line movements from the Mid-Continent and other areas have been increased and no refiner will lack supplies regardless of what happens in Illinois. Pipe-line owners make thousands of changes yearly in the movement of crude oil.

Gasoline pipe lines, practically unknown 12 years ago, are a major factor in the industry's operating facilities. The present mileage which would extend twice across the continent will be steadily expanded provided their ownership continues within the industry.

The Department of Justice has not made clear just what it finds wrong in the operation of these crude-oil and gasoline pipe lines and what it expects to accomplish in its proposed action based on the antitrust acts.

From the stripper-well owners to the distributors of products the position of the oil industry as to this divorcement proposal is well known. To those within the industry pipe lines are as much an essential part of their operations as are the carrier systems to the automobile assembly lines.

Pipe lines are the carriers around which the industry's efficient operations have been built, with the greatest benefits going to the consumers of its low-priced products.

Now there is the additional factor of defense. The greatest need in modern war transportation is protection from overhead attack and assurance of normal operations regardless of weather conditions. The vast underground system of pipe lines delivering crude oil and finished products daily to all parts of the country, and during all seasons takes care of both requirements.

We are glad to salute the pipe liners in this annual number. No stone should be left unturned in assuring that their independence, ruggedness and accomplishments will continue to be part and parcel of this industry.

Wage-Hour Law Application In the Oil Industry

By G. C. STREET, JR.
Regional Director, Wage and Hour Division,
U. S. Department of Labor

THE coverage of all employes depends upon the work done by the individual employe. That is, the individual worker must be engaged in interstate commerce or in the production of goods for interstate commerce. By interstate commerce, I mean that the employe is engaged in the operation of facilities which carry goods from one state into another, or in their repair, reconstruction, and maintenance, or in the necessary physical handling of those goods (which is required to facilitate their transportation). By the "production of goods for interstate commerce, is meant the "producing, manufacturing, mining, handling, or in any other manner working on, any goods which the employer hopes, intends, or has reason to believe, are about to move outside the state where the producing, manufacturing, mining, handling, or otherwise working on the goods, has occurred."

In the oil industry there are several different groups to be considered:

1. There are those employes engaged in the drilling of oil wells, or in occupations or processes necessary to the drilling. The administrator has ruled throughout the effective period of the act that such employes are engaged in mining; and are, therefore, engaged in either the production of goods for interstate commerce or in occupations and processes necessary to such production; and that such drilling employes, therefore, are entitled to be paid in accordance with the provisions of the act.

This applies to all of the various classifications of employes engaged in drilling operations. Drillers, tool dressers, roughnecks are all subject to the act.

2. The next category in which the employes with whom we are concerned falls in that of the production employes and those who are concerned with the treatment of wells in such a way as to increase the amount of production. This will include the pumper and roustabout on a stripper lease and the gager on a lease in flush production. It will include the employe who is engaged in cleaning out a well, or acidizing a well, or in shooting a well.

The pumper and roustabout are engaged in the actual production of goods for interstate commerce if the oil produced from their lease moves outside the state of production. The cleaning crew, the acidizing crew, or the shooting crew, are engaged in a "process or occupation necessary to the production" of goods for interstate commerce.

It can easily be seen, therefore, that such employes are fully entitled to the benefits of the act.

3. This third group with which we are concerned are those men who are engaged in "interstate commerce"; that is, employes of pipe lines. They are engaged in the operation of facilities used for the transportation of goods in interstate commerce, or they are engaged in the maintenance, reconstruction, and repair of such facilities. The right of Congress to legislate concerning such employes has been upheld in numerous opinions of the courts of this country.

It must be pointed out, however, that since pipe lines which carry goods in interstate commerce are subject to the provisions of Part I of the Interstate Commerce Commission Act, and are, therefore, subject to the jurisdiction of the Interstate Commerce Commission, the employes of such a pipe line are not entitled to the payment of overtime as provided by Section 7 of the Fair Labor Standards Act. This exemption is granted by Section 13(b)(2) of the Fair Labor Standards Act. They are, nevertheless, entitled to the payment of the minimum wage provided by Section 6 of the act.

Questions which arise in connection with these matters include such as "whether employes engaged in the maintenance and repair of refineries are covered by the act." In the opinion of the administrator, such employes are entitled to the benefits of the act. However, employes engaged in building a new refinery or new facilities for refining oil are not so entitled to those benefits. Neither are the employes engaged in construction of a new pipe line, even though those who are engaged in the extension, reconstruction, repair, or maintenance of an existing pipe line, are covered by the act.

Once coverage is definitely determined, an employe entitled to the benefits of the act should receive at the present time a minimum of 30 cents an hour (up until October 24, 1945) for the first 42 hours in any work week, or until such time as an oil-industry hearing may establish a different minimum wage. No covered employes shall work in excess of 42 hours a week at the present time (or in excess of 40 hours after October 24, 1940) unless such work is compensated for at one and one-half times the regular rate of pay.

24-Hour Employes

One of the problems confronting the division at the present time has to do with pumpers employed on a lease who have to be on duty 24 hours a day. Another problem is that of so-called executives.

The division holds that no pumper, even though required to stay on a lease 24 hours a day, can actually work that number of hours a day—day in and day out. Where such an arrangement is made between an oil company and a pumper, it behooves each of them to definitely determine, or evaluate, the actual number of hours the employe will be required to work. The facts can only be as they actually are, and it is better to determine such facts and agree to them in writing prior to employment so as to obviate any unpleasant situations arising therefrom.

I have been informed of instances where oil companies have employed a gang of workers, and have classified each of the gang as an executive for the purpose of obtaining an exemption from the overtime requirements. Whether or not the members of such a gang are in fact executives may only be determined in accordance with regulations, Part 541, issued by the administrator. As you know, this definition of an "executive" is a part of the law, as Congress required that the definition of that word be determined by the administrator. In order to claim exemption as an "executive," an employe must comply with the following six requirements in the aggregate. Complying with one or two of such requirements does not necessarily entitle an employe to the exemption. An "executive" must (1) be in charge of an establishment or a department thereof; (2) customarily and regularly direct the work of other employes therein; (3) have the authority to hire and fire other employes, or his recommendations given considerable weight; (4) use discretionary powers; (5) do no substantial amount of work of the same nature as that performed by non-exempt employes of the employer; and (6) be compensated for his work at not less than $30 per week.

What has caused the most confusion is the failure of the public or the industry, and even the employes themselves, to recognize that the act calls for overtime to be compensated for at "time and one-half the regular rate of pay," not time and one-half the minimum wage set out in the act.

For instance, if an employe receives $20 a week and regularly works 40 hours a week, obviously his hourly rate is 50 cents. Overtime rate would be 75 cents.

If this same employe receives $20 a week and works a variable number of hours each week, his hourly rate varies, and it is necessary to divide the $20 he receives each week by the number of hours he works each week to arrive at his regular hourly rate of pay.

If the same employe (used as an example) works 60 hours, his regular rate of pay would be $20 divided by 60, or 33⅓ cents an hour.

At the present time with the limitation of 42 hours a week, this employe is entitled to 18 hours of overtime compensation at time and a half his regular rate of pay of 33⅓ cents. His regular time for the 33⅓ cents is included in the $20 he has received. Therefore, he is entitled to additional compensation of one-half the hourly rate for the 18 hours of overtime.

Now, beginning this October 24, if this same employe works 60 hours a week, receiving $20 as weekly compensation, he will be entitled to receive time and a half his regular rate of pay for 20 hours of overtime.

We have encountered instances where oil companies have employed workers at, say, $1 an hour for 4 hours a day, and $1.50 for another 4 hours the same day. Such a company would contend that it is prepaying overtime in case the employe works over the 42-hour limit in a week. We cannot accept this procedure. The employe's wage in this case is 4 hours at $1, or $4, 4 hours at $1.50, or $6, making a total of 8 hours at $10, or $1.25 an hour as the regular rate of pay. Now, if after October 24, 1940—when the maximum hours change to 40—such an employe should work 48 hours in a week, he would be entitled to 40 hours at $1.25, and 8 hours at $1.87½. The oil company assumes that it has paid 24 hours at the regular rate and 24 hours for overtime, but we cannot recognize that procedure.

It is appropriate here that I call your specific attention to Section 16(b) of the act which reads as follows:

"Any employer who violates the provisions of Section 6 (minimum wage) or Section 7 (overtime requirements) of this act shall be liable to the employe or employes affected in the amount of their unpaid minimum wages or their overtime compensation, as the case may be, and [note this] in an additional equal amount as liquidated damages. Action to recover such liability may be maintained in any court of competent jurisdiction by any one or more employes for and in behalf of himself or themselves and other employes similarly situated, or such employe or employes may designate an agent or representative to maintain such action for and in behalf of all employes similarly situated. The court in such action shall, in addition to any judgment awarded to the plaintiff or plaintiffs, allow a reasonable attorney's fee to be paid by the defendant, and costs of the action."

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This article is a portion of an address delivered at Fort Worth, Tex., last week, before the national convention of the Oil Workers International Union.

Importance of Devonian At Louden Will Affect Illinois' Production

ST. ELMO, Ill.—Disposition of the question "Does the Devonian at Louden, Illinois, contain oil," will evidently be made in the near future if present indications can be relied on. In case the field proves productive in the Devonian, production in the state will take another jump as it did when deep production was discovered in the Salem field and again in the Centralia field. However, the jump will not be so sudden nor will the decline be so sharp as the Carter Oil Co., principal operator and holder of 85 per cent of the 21,000 productive acres in the pool, is already taking steps to provide for an orderly development.

Carter recently filed with the recorder of Fayette County an agreement with independent operators on the well spacing in the pool, one well to each vertical 20 acres. Purpose of the agreement is to promote conservation and increase the recovery from the pool.

Another agreement between the Carter Oil Co. and Hogan heirs would permit the drilling of test wells in Sections 21 and 27-8n-3e, in the heart of the pool. The wells will not be designed for production but will be intended to test the possibilities of the Devonian pay in the area. Three Devonian tests have been drilled in the field and one of them, the Carter Oil Co.'s No. 1 Mary Miller, in Section 12-8n-3e, produced some oil but was on the edge of the structure, while the other two were drilled in Avena Township and were definitely off structure.

At the present time, Carter has more than 1,000 wells in the field producing oil from three horizons, the Weiler, Paint Creek Stray, and Bethel. The same company has 51 gas-input wells used as a part of its repressuring program in the pool; the company has also drilled 21 dry holes in the pool.

Order Tightens Restrictions on Exports of Aviation Fuel

By HENRY D. RALPH

WASHINGTON, D. C., Sept. 16.—Airplane-gasoline export restrictions were tightened last week by a presidential order applying the export-licence-control law to equipment and specifications for the production of aviation motor fuel and tetraethyl lead.

The order, announced September 13 and effective at once, makes it necessary to secure a license from the Controls Division of the State Department for the export of any equipment, except minor component parts, which can be used for the production of aviation fuel by chemical processes, or any technical information regarding such plants or processes except that appearing in a form available to the general public. This latter exemption excludes trade papers from the license requirement.

While no explanation was given for the order, it was presumed that at least one factor leading to its issuance is the apparent policy of the administration to place increasing obstacles in the way of Japanese aggression in Asia by curtailing the amount of war resources and aid available in the United States. Color was given to this assumption by the fact that the Japanese ambassador called at the State Department immediately after the announcement was made.

The text of the order follows:

CONTROL OF THE EXPORT OF CERTAIN ARTICLES AND MATERIALS

BY THE PRESIDENT OF THE UNITED STATES OF AMERICA

A PROCLAMATION

Whereas Section 6 of the act of Congress entitled "An Act to expedite the strengthening of the national defense," approved July 2, 1940, provides as follows:

"Whenever the president determines that it is necessary in the interest of national defense to prohibit or curtail the exportation of any military equipment or munitions, or component parts thereof, or machinery, tools, or material, or supplies necessary for the manufacture, servicing, or operation thereof, he may by proclamation prohibit or curtail such exportation, except under such rules and regulations as he shall prescribe. Any such proclamation shall describe the articles or materials included in the prohibition or curtailment contained therein. In case of the violation of any provision of any proclamation, or of any rule or regulation, issued hereunder, such violator or violators, upon conviction, shall be punished by a fine of not more than $10,000, or by imprisonment for not more than 2 years, or by both such fine and imprisonment. The authority granted in this section shall terminate June 30, 1942, unless the Congress shall otherwise provide.";

Now, therefore, I, Franklin D. Roosevelt, president of the United States of America, acting under and by virtue of the authority vested in me by the aforesaid act of Congress, do hereby proclaim that upon the recommendation of the administrator of export control I have determined that it is necessary in the interest of the national defense that on and after this date the following described articles and materials shall not be exported from the United States except when authorized in each case by a license as provided for in Proclamation No. 2413 of July 2, 1940, entitled "Administration of Section 6 of the act entitled 'An Act to expedite the strengthening of the national defense' approved July 2, 1940," and in the regulations issued pursuant thereto:

1. Equipment (excluding minor component parts) which can be used, or adapted to use, for the production of aviation motor fuel from petroleum, petroleum products, hydrocarbons, or hydrocarbon mixtures, by processes involving chemical change; and any plans, specifications, or other documents containing descriptive or technical information of any kind (other than that appearing in any form available to the general public) useful in the design, construction, or operation of any such equipment, or in connection with any such processes. Aviation motor fuel shall mean such fuel as is defined in the regulations issued pursuant to Proclamation No. 2417 of July 26, 1940, as may from time to time be amended.

2. Equipment (excluding minor component parts) which can be used, or adapted to use, for the production of tetraethyl lead; and any plans, specifications, or other documents containing descriptive or technical information of any kind (other than that appearing in any form available to the general public) useful in the design, construction, or operation of any such equipment, or in connection with any such processes. Tetraethyl lead shall mean such tetraethyl lead as is defined in the regulations issued pursuant to Proclamation No. 2417 of July 20, 1940, as may from time to time be amended.

3. Plans, specifications, and other documents containing descriptive or technical information of any kind (other than that appearing in any form available to the general public) setting for the design or construction of aircraft or aircraft engines.

In witness whereof, I have hereunto set my hand and caused the seal of the United States of America to be affixed.

Done at the City of Washington this 12th day of September in the year of our Lord nineteen hundred and forty, and of the Independence of the United States of America the one hundred and sixty-fifth.

(SEAL)

FRANKLIN D. ROOSEVELT.

By the President:
CORDELL HULL,
Secretary of State.

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Committees Approve Bills Affecting Oil Industry

CONGRESSIONAL committees last week placed their stamp of approval on several bills of interest to the oil industry, while the Interstate Commerce Commission issued new minimum rates on petroleum for eastern motor carriers.

Similar measures to prevent destruction of war materials during peacetime were reported out by Senate and House committees. The bills provide punishment for injuring or destroying any supplies necessary to the national defense, including fuel, the premises for producing and storing fuel, vehicles used for transporting fuel and oil and gas pipe lines.

The Senate military affairs committee approved an act authorizing the president to take over any machinery or tools which have been refused an export license. Object is to keep in this country machinery, including oil-working machinery, intended to be sold to foreign government but which are essential to American industry. Compensation is provided for owners of such materials.

A House-approved bill to extend oil and gas prospecting permits, issued under the 1920 leasing act, until December 31, 1941, was recommended by the Senate public lands committee. The measure is opposed by the Interior Department on the grounds it will interfere with the Government's program to exchange all such permits for leases, as authorized by a 1935 law. The 1920 act was passed to stimulate the search for oil and gas deposits on the public domain. Meanwhile, about 2,000 holders of leases dated January 1, 1939, for which permits were exchanged, were warned by Secretary Ickes that the rentals must be paid prior to October 1. Failure to pay rent will in no way cancel the lease or the obligation for payment. Unless leaseholders file formal requests for relinquishing their claims with local land offices before the next rental on January 1, 1941, the government will enforce payment of accrued rentals. The same situation will face leaseholders whose yearly rental for the third year falls due January 1, 1941. The 1935 law waived the rentals for the first two lease years.

In a new minimum-class and commodity-rate schedule set up by the Interstate Commerce Commission for motor carriers in the New York-North Carolina trunk-line territory, commodities involved include petroleum products other than in bulk in tank trucks. Excluded are petroleum products in bulk in tank trucks.

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War Department Orders Speed-Up Of Toluene Production

FOLLOWING the announcement that reserve stocks of toluene will be purchased by the Government to fill any gap which might otherwise occur before production can be obtained from petroleum to meet the needs of the program for producing TNT (trinitrotoluene), the War Department issued an order to the Humble Oil & Refining Co., of Houston, Tex., directing it to speed up plans for constructing a toluene plant at a site yet to be selected. This speed-up letter, issued with the approval of the National Defense Advisory Commission, will enable the company to proceed without delay while the unsettled details of the formal contract are being completed.

Similar speed-up orders were issued to E. I. Du Pont de Nemours Co. and Atlas Powder Co., both of Wilmington, Del., directing them to proceed with plans for the construction of TNT plants at sites not yet selected. When these, and probably other, TNT plants get into operation making high explosives they will require supplies of toluene greater than the normal output from coal tar and will open up a sizable market for petroleum toluene. The total demand for toluene for the defense program has not been announced, but it probably will be sufficient to require the use of other plants for producing it from petroleum.

Humble President Hits Texas Special Allowables Policy

AUSTIN, Tex.—The Railroad Commission's policy of granting increased allowables to fields where operators show that the higher allowable can be produced without physical waste, and there is a market demand for the additional oil, was challenged last Saturday by H. C. Wiess, president of Humble Oil & Refining Co. In a letter to the commission, made public by Chairman Lon A. Smith, Mr. Wiess took exception to a recent statement of Mr. Smith that no complaint had been made against the present proration order and after a recitation of the complaint of his company against alleged inequities explained he felt impelled to write because "the inequities are so pronounced and the tendencies toward demoralization are so great."

Mr. Wiess said his company had tried to be cooperative in sharing its crude markets on an equitable basis and had continued to extend its pipe lines, but warned that such essential service to producers "can not be maintained if competing purchasing companies are permitted to secure their needs from selected fields enjoying excessive allowables."

He reminded the commission that in August his company had complained of "inequities arising out of granting shutdown exemptions and special allowables to Gulf connected fields in West Texas." The practice has been aggravated since entry of the September order, Mr. Wiess stated, "by exemptions and special allowables granted without hearing in some 10 fields; and indications are that additional exemptions and exceptions may be granted following the hearings on some 10 other fields." He also reminded the commission that in the aggregate, marginal allowables and exemptions from shutdowns amount to about 600,000 bbl. daily, or nearly half the state total.

He cited as examples of exemptions and special allowables granted since issuance of the September order the Walnut Bend, Bonita, and Rogers & Rogers fields in North Texas. Sinclair purchases all of the oil and is the principal producer in Walnut Bend and Bonita, he noted. These fields enjoy an allowable from 3½ to 7 times as great as the average for the area, whether considered on a per well or on a per acre basis, Mr. Wiess said.

Continuation of the policy may mean an allowable in excess of demand with renewal of the process of accumulating stocks, as the Bureau of Mines' reports already indicate an accumulation of oil in storage in Texas during August, he stated.

Suggested Program

To counter the tendencies toward demoralization Mr. Wiess suggested the following program:

"It appears the situation is one which requires (1) the adoption of and adherence to a fixed program of holding the allowable within the Bureau of Mines' findings of market demand for the state as a whole; (2) the adoption of some equitable yardsticks or principles for the allocation of the state's allowable among the fields of the state and continuous adherence to such principles over a period of time with a view to the establishment of stable producing and purchasing conditions, and (3) immediate cancellation of the exemptions and special orders by which individual fields are enjoying inequitable advantages."

In his reply to the Humble president's statements, Chairman Smith said no reports had come to the commission that allowables were requested where there had not been a market demand and where there would be physical waste in granting such applications. To the specific complaints of Mr. Wiess against increases in fields where Sinclair Prairie is the principal producer and purchaser and in West Texas where the Gulf has connections, Chairman Smith replied:

"I never look into the question as to what oil company or corporation is asking for an increase in line with the market demand and physical-waste situation. I think it should be enough for the commission to know that these two vital principles are not being violated in granting of permits and as long as this attitude is being maintained, I cannot see wherein the commission is erring in granting these increases which are intended to equalize production throughout the state."

H. C. WIESS

Practices complained of by Mr. Wiess were reflected in the commission's weekly allowable summary which showed a gain of 11,967 bbl. daily during the past week to a daily average permissible of 1,344,338 bbl., or 24,038 bbl. in excess of the market demand as gaged by the Bureau of Mines. Deduction of underproduction at the estimated 2½ per cent, however, would lower the actual daily flow to 1,310,729 bbl., or 9,571 bbl. under the federal estimate.

Operators in the K.M.A. and Hull-Silk fields in North Texas also have filed complaint of alleged inequities in those fields as against others of comparable depth. A hearing has been set for September 20 at which there may be mention of the three fields cited by Mr. Wiess.

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Carter Revises Policy Toward Employes Called to Service

A revised policy with regard to employes called for compulsory military or naval training has been announced by the Carter Oil Co. and Oklahoma Pipe Line Co., effective September 6.

The new policy takes into consideration the fact that the training period may be of more than 90 days duration, and replaces the policy on that basis, adopted by the companies in July.

Regular employes with a year or more of service who may be called for training with federal or state armed forces by virtue of membership in the various reserve organizations, the National Guard or Naval Militia, or who may be included either by draft or enlistment in the proposed selective service, are covered.

Such an employe will be granted a special leave of absence for the duration of this training with a maximum of 1 year from the date of call, and upon returning from leave within a specified period after satisfactory completion of training, he will be reinstated in his former position unless a change in operations has affected his job status in the meantime. Every effort will be made to find suitable employment for an employe whose job status has changed.

An employe on special leave will be paid by the companies, insofar as permitted by law, for a period not to exceed 90 days, the difference between his total base pay from the state and federal governments, less the normal assessments uniformly charged to all of like rank in the same unit, and his salary in effect when called. Also, special concessions for continued participation in the various company thrift, benefit, and group insurance plans will be made.

An employe who resigns to enlist in one of the regular armed services of the United States will be given special consideration should he later apply for reemployment.

DEATHS

J. A. STRACK, 58, of Cut Bank, Mont., secretary-treasurer of Steel Creek Production Co., Grant Oil Co., and Cut Bank Refining Co., died August 28.

ROBERT I. DAVIS, 67, production superintendent for Kansas Oil & Refining Corp., died September 13 of injuries suffered in an automobile accident 2 days previous.

JOHN B. KELSEY, 102, veteran oil lease man and scout, died at his home in Harlingen, Tex., on September 12. Mr. Kelsey, born at Ithaca, N. Y., in February 1838, retired from the oil business when the Prairie Oil & Gas Co. was merged with Sinclair Oil & Gas Co., but refusing to remain inactive started developing a citrus grove near Harlingen. He is survived by his widow, and two daughters at Harlingen, and his son, Dana H. Kelsey, vice president of Sinclair Prairie Oil Co., Tulsa.

LOREN B. ROBERTS, 51, manager for Socony-Vacuum Oil Co., Inc., in Ohio, died at his home in Cleveland after an extended illness on September 13.

HARRY N. GARDNER, 70, died in a Tulsa hospital on September 14 after a protracted illness. Born in Pennsylvania, he moved to Oklahoma in 1905, came to Tulsa in 1915 and for 11 years was credit manager for Oil Well Supply Co.

THE MARKETS*

CRUDE OIL: Basic conditions in the crude-oil market remain sound. However, warnings are being repeated that exemptions in Texas and special relief from proration orders are combining to produce a potentially unhealthy condition. Fundamentally, the crude-oil market remains under the cloud of depressed gasoline prices which prevail throughout the country. There was a small advance of 3 cents per barrel posted for Turner Valley crude and naphtha on September 12 by Imperial Oil, Ltd.

REFINERY: Movement of motor fuel from inland refineries is being maintained at a rate comparable with August but the price structure in most sections of the country is depressed. Reductions of ½ cent per gallon were made to dealers and tank-wagon consumers in the Pennsylvania district. Cylinder stocks were quoted 1 cent lower by Pennsylvania refiners. Natural gasoline is continuing the gains started in late August and fuel oils are in a strong position at refineries and in consuming centers.

TANK-WAGON AND POSTED DEALER: General reductions of ½ cent per gallon were posted in Pennsylvania and Delaware last week following similar declines in New York, the New England states and in other East Coast markets. Reductions ranging from ½ to more than 3 cents were made during the first half of September in dealer and consumer tank-wagon prices in South Atlantic states.

FINANCIAL: Oil securities sold off over a narrow range, rallying slightly at the close. Average of 30 representative stocks for the week ended September 14: High, 22.09; low, 21.26; close, 21.43. Week ended September 7: High, 22.42; low, 21.13; close, 22.09.

*Detailed information in Market Section.

International

Venezuela . .

July Production Off 660,000 Bbl.

CRUDE-OIL production in Venezuela for July totaled approximately 17,232,500 bbl., a daily average of 555,887 bbl. For the same month in 1939 the crude-oil production from Venezuela was reported at 17,892,800 bbl. Production figures from Venezuela have been unavailable from private sources since the outbreak of the European war.

The July 1940 production was reported at 2,461,786 metric tons, which equals 17,232,500 bbl. using an arbitrary conversion ratio of 7 bbl. per ton. In the interval of almost a year between definite reports on Venezuelan production there has been no material shift in the relative positions of the operating companies. In July, for instance, subsidiaries of Standard Oil Co. of New Jersey, exclusive of the interest held indirectly through International Petroleum Co. in Mene Grande Oil Co. output, produced a total of 7,181,000 bbl. Subsidiaries of Royal Dutch-Shell, including Caribbean Petroleum Co., Colon Development Co. and Venezuela Oil Concessions, Ltd., produced a combined total of 6,506,000 bbl.

Mene Grande Oil Co., operator of the Oficina field, has more than doubled its production of a year ago. However, Mene Grande sold 50 per cent of its production in Venezuela 1½ years ago to International which in turn sold one-half interest to Shell. Consequently, Mene Grande's net gain is more modest than the bald production figures would indicate.

Petroleum exports from Venezuela in July totaled 2,052,772 metric tons, or approximately 14,552,820 bbl.

The production and exports by companies for July are shown below in approximate barrels of 42 U. S. gallons:

Company—	July 1940 Production	July 1940 Exports
Caribbean Petroleum Co.	1,131,725	825,840
Venezuela Oil Concessions, Ltd.	4,782,988	4,967,720
Colon Development Co.	591,570	571,490
Lago Petroleum Co.	4,245,318	3,762,870
Mene Grande Oil Co.	3,471,811	3,014,000
British Controlled Oilfields, Ltd.	21,511	49,280
Central Area Exploitation Co.	51,184	.....
Standard Oil Co. of Venezuela	2,907,184	1,361,620
Compania de Petroleo Lago	28,511	.....
Tocuyo Oilfields of Venezuela, Ltd.	672	.....
Socony-Vacuum Oil Co.	28	.....
Total	17,232,502	14,552,820

The following table shows the production by fields for July:

Cabimas	1,772,415	Pedernales	154,063
Lagunillas	5,656,858	Temblador	361,830
Tia Juana	3,249,164	Oficina	1,363,614
Bachaquero	159,775	Jusepin	464,128
La Concepcion	64,946	Santa Ana	9,562
La Paz	39,683	San Joaquin	105,049
Mene Grande	1,131,727	El Roble	78,141
El Cubo	591,570	El Tigre	2,009
Cumarebo	49,252	Guario	23
La Palmas	2,961	Socororo	658
El Mene de Maurora	21,511	El Mene de Acosta	672
Hombre Pintado	51,184		
Quiriquire	1,901,706	Total	17,232,502

According to the budget recently adopted by the Venezuelan Congress for the fiscal year from July 1940 to July 1941, a reduction of 17 per cent in the revenue from the Department of Mines, virtually all of which comes from the oil industry, is anticipated. The anticipated income from the Department of Mines in the new fiscal year is 90,000,000 bolivares against the previous year's estimated income of 108,000,000 bolivares.

Maintenance of high production in the fall of 1939 in anticipation of a war demand that did not develop enhanced the national revenue from the department of mines by offsetting lower production of recent months. Because of this the effect of the decreased oil production on national finances was not felt severely until the current fiscal year.

Mexico . .

Authorize Strike of Central Zone Workers

INTERNAL troubles of the expropriated Mexican oil industry continue to mount. A strike of workers in the Central Zone has been authorized along with adoption of a resolution to withdraw the 5,000 members from the Confederation of Mexican Labor (C.T.M.) and organize a separate union.

The executive committee of Central Zone workers charged that the oil administration had decided to use a federal labor board authorization to break a contract with the workers as a lever to enforce President Cardenas' economy program. The contract, relief from which was sought and obtained through appeal to the labor board, is the one imposed on private oil companies in 1938. The private companies found the terms of the contract intolerable and declined to accept all provisions. Later, properties of the private companies were expropriated and the national administration attempted to carry on the petroleum industry under expense burdens that have been found impossible.

Cardenas has insisted upon immediate moves to put the expropriated industry on a paying basis, a policy that involves dismissal of about 2,600 workers, wage reductions and elimination of rent allowances.

Chile . .

Bill Would Encourage Petroleum Exploration

DESIGNED to encourage oil-exploration work, a bill that would permit Chileans exclusively to exploit domestic oil properties for 5 years is now under consideration by the congress committee on legislation, constitution and justice. The bill was presented by Deputy Castelblanco, president of the Radical party.

Existing legislation limits ownership of oil properties to the state which, the preamble of the bill states, removes inducements for private interests to prospect for oil. The new bill gives operators a period of 5 years to operate properties and the period may be prolonged by presidential orders. Under it the state would receive 5 per cent of production for the first 5 years and 10 per cent for the next 45 years.

Passage of the bill is considered assured because of the lack of exploration in the country where evidences of petroleum deposits have invited exploration for years. The assurance of reasonable profits which the bill provides is expected to bring about such exploratory work.

Spain . .

Company Would Explore For Petroleum Deposits

IN an effort to reduce somewhat Spain's present complete dependence on foreign sources for crude petroleum, a Spanish company has applied to the government for permission to explore certain sections of the country for deposits of petroleum. The firm, known as the Compania de Investigacion y Exploraciones Petroliferos, S.A., requested exclusive rights for the examination of formations and the ultimate drilling of wells, if indications are satisfactory. If no pertinent objections are advanced against the proposal, the company will undoubtedly receive the right to start work.

The request covers four areas amounting to 29,800 hectares located in the Province of Soria, with separate sections on either side of the Douro River. Preliminary reports are promising, although extensive and intensive explorations have not yet begun.

The commercial attache of the American Embassy in Madrid, who released the news, reports this is probably the first time a real effort will be made to determine whether petroleum deposits of commercial value exist in Spain.

Argentina . .

Y.P.F. Production Increases 20 Per Cent

PETROLEUM production by the national company in Argentina continues its rate of increase this year at approximately 20 per cent over 1939 which in itself was a record year. The national company, Yacimientos Petroliferos Fiscales, commonly known as Y.P.F., produced 7,925,912 bbl. of crude during the first 8 months of this year, an increase of 1,325,296 bbl. over 1939 when output for the comparable period totaled 6,600,616 bbl. For the first 8 months of 1938 the Y.P.F. output was 5,786,420 bbl.

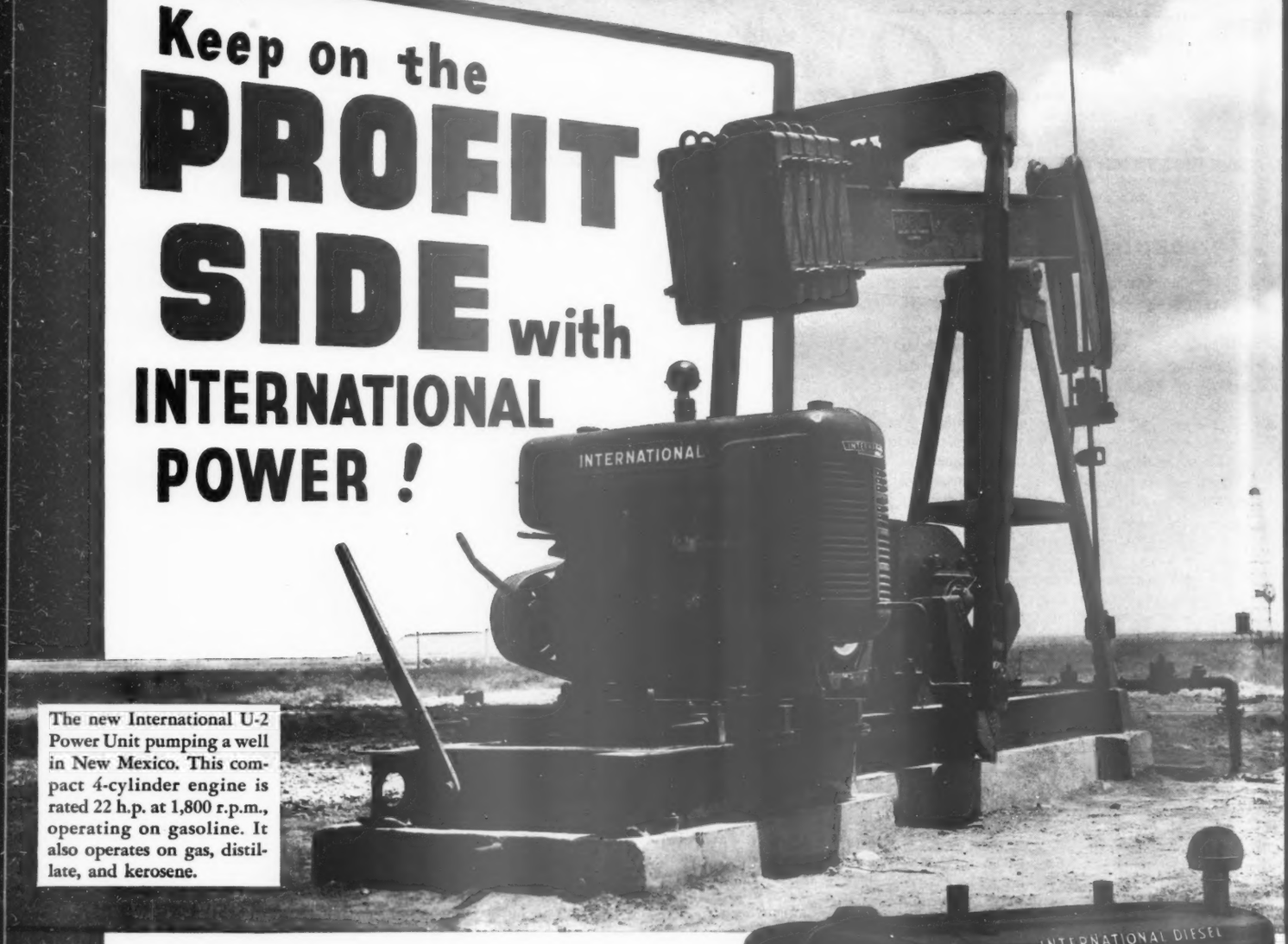
The most substantial increase in production has come from the Province of Mendoza where output for the first 8 months totaled 1,412,608 bbl. this year compared with 377,510 bbl. for the same time in 1939. Exploration of the prolific Tupungato field in Mendoza is exclusively responsible for the increment in production from that part of the country. Y.P.F. production in the provinces in Juyjuy and Salta increased slightly through the first 8 months, totaling 492,991 bbl. this year against 312,084 bbl. for the same months last year.

Plaza Huincul increased its production slightly to 474,572 bbl. for the first 8 months, a gain of 41,240 bbl.

The Comodoro Rivadavia field, the backbone of the Argentina petroleum industry, produced 5,545,741 bbl. in the first 8 months, a total that varied only slightly from the preceding year.

Production by the private companies operating in Argentina is not yet available for the 8 months, but through the earlier months this year their combined output averaged approximately 615,000 bbl. per month. Total output for Argentina for the 8 months was approximately 12,835,000 bbl.

Keep on the PROFIT SIDE with INTERNATIONAL POWER !



The new International U-2 Power Unit pumping a well in New Mexico. This compact 4-cylinder engine is rated 22 h.p. at 1,800 r.p.m., operating on gasoline. It also operates on gas, distillate, and kerosene.

INTERNATIONAL POWER UNITS are in a class by themselves when it comes to *versatility, operating economy, low maintenance,* and *long life.* On-the-job evidence through the years has proved the great value of International engineering, construction and after-sale service.

Today the line includes three new carburetor-type engines—the U-2 shown above; the U-4 rated 31½ h.p. at 1,800 r.p.m. (on gasoline); and the U-6 rated 41 h.p. at 1,500 r.p.m. (on gasoline). In addition to these 4-cylinder engines, there are 6-cylinder units in the line ranging up to 110 max. h.p. Here is a wide variety of sizes to choose from—and when additional power is needed, two or more can be installed and cut in and out as the load requires.

Follow the advice of engineers who have specified International Power Units for years. They know from experience that it pays *to standardize* on International. Let the nearby International industrial power dealer or Company branch tell you about these famous engines and their record on various types of jobs.

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago, Illinois

International DIESEL Power

Four new Diesel Power Units are also available in the International line—the big 6-cylinder UD-18 shown here, rated 100 h.p. at 1,400 r.p.m.; the small UD-6, and the in-between sizes, the UD-9 and UD-14. They'll show you something new in Diesel design, low-cost power, easy starting, and maintenance economy.

INTERNATIONAL Industrial Power

Minneapolis Refinery to Add Cracking and Blending Facilities

By T. P. SANDERS

WITHIN the past 2 years two refineries have been placed in operation in the St. Paul-Minneapolis area, representing the first refining facilities in Minnesota. With a total capacity of approximately 5,000 bbl. of crude oil per day, the two plants together process between 3,000 and 4,000 bbl. daily. Although located adjacent to the Mississippi River, the crude oil is shipped in by rail from southern Illinois and not by barge. The seasonal demand for refined products varies immensely in this locality, and for this reason one plant is to be enlarged by the addition of a 2,000-bbl. cracking plant. An ethyl blending plant is also to be added immediately.

The first of the two plants was built by Northwestern Refining Co. at St. Paul Park, construction having begun 2 years ago. The second plant was built by Purzone, Inc., on the Mississippi River north of Minneapolis and was put on stream late last December in 30-below-zero weather. The Twin Cities area is believed to comprise one of the best fuel-oil markets in the United States, both potentially and at present, but since the gasoline market in these cities is highly competitive the distribution and sales of motor fuel are confined almost entirely to the comparatively undeveloped marketing areas of northern Minnesota and eastern North Dakota. With a large network of good roads, truck transportation can be used economically for dispensing refined products over the entire area.

Purzone Plant

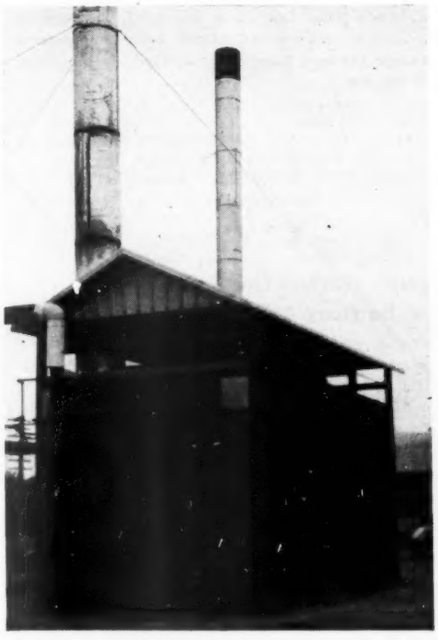
The Purzone refinery in Minneapolis is equipped to process 2,500 bbl. of crude per day, but the average daily run is 1,600 to 1,700 bbl. Eight tank cars are unloaded daily into the plant's crude storage. This crude is brought from the Mill Shoals and the Keensburg fields of southeastern Illinois, covering 800 miles in transit. Transportation costs are 60 to 65 cents per barrel.

Crude enters the plant through a heat exchanger, where it is heated to 250° F. Here the small amounts of salt water are removed and 10 per cent of the run is flashed off, as these light ends do not require further heating. The furnace heats the remaining charge to 610° F., and at this temperature the charge passes into the flash tower. No. 5 fuel oil (600 viscosity) is removed from the bottom of the flash tower while the vapors pass into a 4 by 60-ft. fractionating tower containing 22 bubble trays. Four simultaneous cuts are taken from the tower, and by varying these to meet seasonal conditions the following products are made: Gasoline; high-flash tractor fuel of 48 to 50 A.P.I. gravity; low-flash tractor fuel of 44 to 46 A.P.I. gravity; kerosene; No. 1 distillate; No. 2 gas oil; two grades of diesel fuel, one of which is 36 to 38 A.P.I. gravity and the other 31 to 35 A.P.I. gravity; U.G.I. gas oil, and No. 5 and No. 6 fuel oil.

The gasoline, kerosene, tractor fuels, diesel fuels, and gas oil all undergo treatment for sulfur and mercaptans. It is a hydrochloride treating process, and is carried on at a cost of only ½ cent per barrel. All refined products are handled by the storage and truck-loading facilities at the plant. Storage space is on hand for 40,000 bbl., 6,000 bbl. of which is for refined products.

Construction of an ethyl blending plant is to begin immediately at the Purzone refinery. At the present time part of the gasoline is being blended by addition of ethyl fluid but this is carried on elsewhere by special arrangement. The future blending will produce a premium gasoline of 78 to 80 octane number and a regular-grade gasoline of 72 to 74 octane number.

Early next year a 2,000-bbl. combination unit will be constructed in order to make operation of the plant more flexible. It is planned to have this in operation for the summer of 1941 so that the gasoline yield can be increased through use of the cracking facilities to meet the summer demand. This will serve to reduce the storage space needed for fuel oil.



Pipe still used at the Purzone refinery in Minneapolis where 750 bbl. of gasoline is produced daily

At present the Purzone refinery is producing 27,000 to 30,000 gal. of gasoline per day. While the company is locally owned, connections with producing interests in southern Illinois insure a supply of crude while the Mill Shoals and Keensburg fields hold up. In case of a shortage of Illinois oil, it is believed that oil from Kansas, or possibly from Nebraska, can be obtained at no greater freight costs. The company's refining is managed by H. A. Ohlgren, president, while crude-oil purchasing and tank-car shipments are directed by Alan Gowans, secretary and treasurer.

Northwestern Refining Co. Plant

The 2,000-bbl. topping plant at St. Paul Park, owned by Northwestern Refining Co., was the first refinery in Minnesota. Crude for this plant is also shipped in by rail from Illinois, and the company is organized along much the same lines as Purzone, Inc. In both cases fuel oil marketed in the Twin Cities represents a considerable portion of the income and serves to equalize winter activity with summer activity.

There is possibility of another refinery in this area. Union Pipe Line Co. of Centralia, Ill., plans to build a line to conduct crude from the new Falls City, Neb., discovery to a tank-car loading rack at Falls City. It is planned to send it by rail to Minneapolis, where it will be blended with higher-gravity oil from Ranch Creek, Wyo., before refining.

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Britain's Blockade Intensifying Oil Famine in Europe

(Continued from Page 61)

Finland.—Industry, particularly fishing, is reported to be seriously handicapped by lack of oil. Finland is another nation which is now looking to Russia for all its oil needs and the two countries recently completed a trade agreement by which the Soviets will supply the Finns with oil in return for other products.

Greece.—Gasoline stocks have been placed under government control and it was estimated recently that there was but 4 weeks' supply remaining in storage.

Motor Traffic Restricted

France.—Attempts of the Vichy government to restore some semblance of normal economy are handicapped by the shortage of gasoline for trucks and fuel oil for trains. No unauthorized motor traffic is permitted and buses and public-owned vehicles are not permitted to operate in some parts of France on Sunday. Large timber camps have been erected in the Landes region of southern France for converting wood into charcoal for synthetic motor fuel.

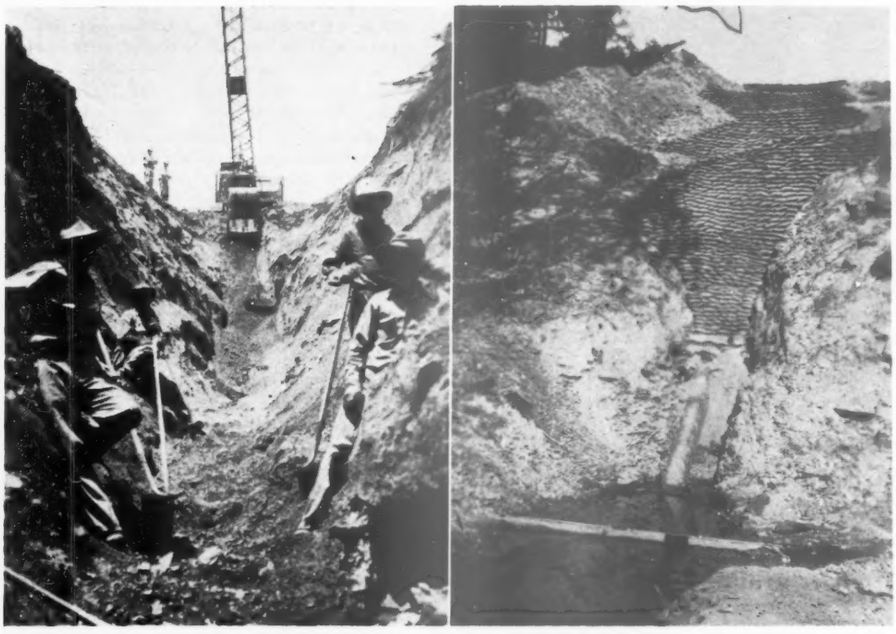
Rumania.—Demands on Rumania, largest producer of crude oil in central and western Europe, have been increased so greatly that the export tax was recently raised from 13 to 20 per cent.

Spain.—Prices of gasoline have been increased substantially. The use of motor cars of more than 25 hp. is forbidden, the use of less powerful cars is limited and the sales of fuel for pleasure boats are prohibited. In an effort to ease its dependency on outside sources for oil, Spain recently accepted bids for the construction of a synthetic-gasoline plant.

Italy.—Restrictions on the use of automobiles and rationing of motor fuel have been in effect for some time. Prior to the war Italy obtained only about 1 per cent of its petroleum requirements from domestic production, while 97.7 per cent was imported through the Mediterranean, 70 per cent through the Straits of Gibraltar. In an attempt to relieve herself of this hazardous situation, Italy has been expanding synthetic production and recently opened a plant for distilling asphaltic rock at Ragusa in Italy. This plant has a capacity of 50 metric tons per day and it is reported that 80 per cent of the oil produced can be converted into gasoline.

Italy is now dependent on Rumania for its supply of petroleum and this year contracted for the delivery of 2¼ million barrels of Rumanian crude.

Pipe-Line Activity



Left: Ditching first canyon only 800 ft. from starting point of 55-mile 24-in. line being laid by T. R. Jones for Michigan Gas Transmission Co., near Rockville, Ind. Right: Concrete breakers at Coal Hill, one of the numerous hills encountered in this project where a large number of concrete breakers have been installed. In the water at the bottom of the hill a large concrete block was poured on the sag

Montana-Dakota Utilities Prepares To Serve New Areas

DENVER, Colo.—A new 120-mile pipe line now being laid by W. A. Bechtel Co. through Fort Peck Dam and Glendive, Mont., will link the Baker gas field in southeastern Montana and southwestern North Dakota with the Bowdoin gas field near Saco, Mont. These are two of Montana's largest fields. The new pipe line between Fort Peck and Glendive, Mont., will tie these two large gas fields together into one large gas distribution system and will make the gas reserves of both fields available to the present market now being served by Montana-Dakota Utilities. This will also make available an adequate supply of gas for the pipe-line extension into eastern North Dakota and western Minnesota, which will probably be built in 1941.

This pipe line when layed, will serve towns not now having natural-gas service such as Jamestown, Valley City, Fargo, Grand Forks, Crookston, and others. A 12-in. pipe line from the Baker field was built to Bismark, N. D., in 1930. This pipe line is of ample size to supply gas to markets in eastern North Dakota and western Minnesota. Specifications for the new line have not been issued.

F.P.C. Sets Hearing for Tennessee Gas Project

WASHINGTON, D. C.—The Federal Power Commission has postponed to September 23, 1940, the public hearing previously set for September 4 on the application of the Tennessee Gas & Transmission Co., with principal offices in Chattanooga, for a certificate of public convenience and necessity for the construction and operation of a natural-gas pipe line from the gas fields in North Louisiana to Nashville, Knoxville and other Tennessee cities, and to Asheville, N. C. Finding that good cause had been shown for such continuance, the commission granted the petition filed on August 30, 1940, by counsel for the company requesting that the hearing be continued until September 23. The hearing will be held on that date, beginning at 10 o'clock a. m. in the hearing room of the commission, in the Hurley-Wright Building, Washington, D. C.

Superior Will Lay Line From New Harmony Field

Superior Oil Co. of California is preparing to build 16 miles of 4-in. line from the New Harmony field in Griffin County, Indiana, to the Albion field in Sections 19 and 24-2s-11e, Edwards County, Illinois. The new line will connect to Superior's line from New Harmony to Mount Vernon, Ind., where a river terminal is located. The line was originally scheduled for construction about 2 months ago but was postponed pending development of the Albion pool and has now been revived.

F.P.C. Orders Hearing For Milwaukee Line

WASHINGTON, D. C.—The Federal Power Commission has ordered joint public hearings with state regulatory commissions to be held at Madison, Wis., on October 7, 1940, on the applications of the Western Natural Gas Co. and the Independent Natural Gas Co. for certificates of public convenience and necessity for the construction and operation of natural-gas pipe lines terminating at Milwaukee. The hearings will commence at 10 a.m. in the hearing room on the second floor of the state capitol.

The commission's order provides for the participation in the proceedings of the Public Service Commission of Wisconsin, the state Corporation Commission of Kansas, the state Railway Commission of Nebraska, the Corporation Commission of Oklahoma, the Public Service Commission of Missouri and any other interested state commissions that might care to join. Acting upon petitions filed by the city of Milwaukee in both applications, the commission has permitted that city to intervene in the proceedings.

Limited participation, to the extent of introducing relevant and material evidence, making oral argument if such be ordered, and filing briefs has been granted by the commission to the National Coal Trade Association and the Truax-Traer Coal Co., the Railway Labor Executives Association, Joseph Weed and others on behalf of 58 railroad companies, the Coal Trade Association of Indiana, the Northern Illinois Coal Trade Association, and the Northwestern Retail Coal Dealers Association. Petitions filed by these associations and companies for intervention are denied by the commission.

Western Natural Gas Co., a Delaware corporation with principal offices at Wilmington, has applied for a certificate for a pipe line extending from the Hugoton field in southwestern Kansas, a distance of 770 miles direct to Milwaukee, running through Iowa and perhaps with laterals into Nebraska or Missouri or both. Estimated aggregate cost of the proposed system will amount to approximately $30,000,000, the applicant states. Paul Kayser, of New York City, is president.

The Independent Natural Gas Co., now a wholly-owned subsidiary of Phillips Petroleum Co., with principal office at Bartlesville, Okla., has applied for a certificate for the construction of a line extending from Sherman County in the Texas Panhandle to Milwaukee, a distance of approximately 877 miles. Estimated initial construction cost is given by the applicant as $28,698,000.

Stanolind Awards Contracts for La Plata-Wood River Line

Stanolind Pipe Line Co. has let contracts for the construction of a 180-mile 12-in. line between La Plata, Mo., and Standard Oil Co. of Indiana's refinery at Wood River, Ill. Job 1, which consists of 67 miles in the northwestern section, including 15 miles of loop on the trunk line, and Job 2 consisting of 68 miles in the central section of the line were awarded to O. C. Whitaker Co. Job 3, consisting of 45 miles in the southeastern section, was let to Texokan Co. Work on the construction of the loop starts this week. The balance of the work will start early in October.

Sinclair Will Lay New Line At Gainesville, Tex.

The pipe-line division of Sinclair Refining Co. is preparing to enlarge its outlet for the Walnut Bend field of Cook County, Texas, where it is the only crude buyer. Plans call for a 6-in. line to be laid from the field to Gainesville, Tex., where the company has a loading rack on the railroad. This will be parallel to a 4-in. line which has been handling the production. Sinclair Prairie Oil Co. is the largest operator in the field which recently was given an allowable increase.

Socony-Vacuum Plans Short Line Near Casper, Wyo.

Engineers of Socony-Vacuum Oil Co., Inc., are preparing to make a survey and acquire right-of-way for a 13-mile 4-in. welded line which will be laid between Coal Creek and the company's refinery at Casper, Wyo.

Gathering System to Be Laid At Falls City, Neb.

OMAHA, Neb.—The newly organized Independent Pipe Line Co. announced today plans for immediate construction of a gathering system in the new oil field in Southeast Nebraska. Pipe has been ordered. The oil will be carried to a 20-car loading rack on trackage just outside Falls City, and shipped by rail to Omaha and Minneapolis.

John W. Towle, Omaha, president of the Omaha Steel Works, is president of the new company. T. L. Alford, Minneapolis, Minn., is vice president.

Natural Gasoline

Butane-Recovery Equipment Added at Long Lake Plant

DALLAS, Tex.—Expansion of the gas-recycling plant of Tide Water Associated Oil Co. and Seaboard Oil Co. in the Long Lake field of Anderson County, East Texas, is being started this week. The work will consist of adding facilities for the manufacture and marketing of butane, and is expected to be completed by about October 1. The plant has a daily gas-recycling capacity of 60,000,000 cu. ft. Storage capacity of 96,000 gal. is being added for handling future butane production, which will be shipped by tank car from the plant.

Natural Gasoline Association Plans Active Technical Year

Getting ready for an active year in its technical studies the Natural Gasoline Association of America has just announced the committee lists and activities for the fiscal year of 1940-41. According to William F. Lowe, secretary-treasurer of the association, chairmen and vice chairmen of the principal committees are as follows: Economics committee, J. R. Jarvis of Lone Star Gasoline Co., Dallas, Tex., chairman; H. E. Means of Coltexo Corp., Monroe, La., vice chairman gas-contract committee; R. A. Worley of Parade Gasoline Co., Inc., Shreveport, La., chairman; John T. Oxley of Warren Petroleum Corp., Tulsa, vice chairman; gas-testing committee, H. L. Oder of Cities Service Oil Co., Bartlesville, Okla., chairman; H. D. McLean of Hercules Gasoline Co., Inc., Shreveport, La., vice chairman. Legal committee, Wilbur J. Holleman, Glen Rose Gasoline Co., Tulsa, chairman; W. P. Z. German, Skelly Oil Co., Tulsa, vice chairman.

Research and educational committee, B. R. Carney of Shell Oil Co., Inc., Tulsa, chairman; W. F. Fulton, United Gas Pipe Line Co., Shreveport, La., vice chairman. Specifications and outage committee, Howard E. Felt, Warren Petroleum Corp., Tulsa, chairman; Harry Wheeldon, Lone Star Gasoline Co., Dallas, vice chairman. Technical committee, C. R. Williams, Continental Oil Co., Ponca City, Okla., chairman; H. H. Beeson, Sabine Valley Gasoline Co., Inc., Shreveport, La., vice chairman. Traffic committee, F. A. Shellhorn, Hanlon-Buchanan, Inc., Tulsa, chairman; E. C. Kitching, Phillips Petroleum Co., Bartlesville, Okla., vice chairman.

In speaking of the research work planned for the year, George P. Bunn, Phillips Petroleum Co., president of the association, stated that the agenda was so crowded with valuable but time-consuming projects that division of work among subcommittees will be required to conclude some projects before the annual convention next spring.

"Among the more interesting activities of the technical committee," said Mr. Bunn, "is that concerned with studies of low-temperature fractional distillation apparatus and procedure. This project has been under way for some months as a cooperative study among 15 different laboratories. Preliminary studies involving the exchange and analysis of identical gas samples are nearly completed and the work of correlation of results is about to begin under the supervision of Dr. G. G. Brown, University of Michigan, and Dr. Walter J. Podbielniak of Chicago. The object of the project is to eliminate all possible sources of error in present apparatus and to standardize procedure as far as possible. It will be some months before the final report will be completed and the committee will turn to a similar investigation of fractional analysis of liquids. A meeting of interested technical men to discuss the correlations of the present studies and to plan the new phase will probably be held in Dallas late in November.

"The gas-testing committee will continue its studies of the present charcoal testing code for determining the gasoline content of natural gas and is working on a new method for determining the specific gravity of the high-pressure gases from distillate wells. Other studies of improved methods for measuring, sampling, and testing the high-pressure gases in repressuring and pressuring projects are also planned for this committee."

Natural Gasoline Production Greatly Increased in July

Production of natural gasoline in the United States increased materially during July the Bureau of Mines reported in its monthly statement. Daily average production in that month totaled 6,346,000 gal., compared with 6,161,000 gal. in June. The outstanding increase was in Texas, particularly in the Panhandle, East Texas and the Gulf Coast.

Texas' total production for the month was 80,717,000 gal. out of the total of 196,728,000 gal. produced during July, as compared with 71,994,000 gal. in June and a nation-wide total of 184,842,000 gal. Oklahoma's monthly production increased from 33,018,000 gal. in June to 33,550,000 gal. in July, while California's production for the 2 months was 47,980,000 and 49,797,000 gal., respectively.

Stocks of naturals continued to increase and at the end of the month totaled 318,528,000 gal., of which 150,360,000 were at refineries and 168,168,000 gal. at plants and terminals. This was 24,528,000 gal. more than was on hand the first of the month and the highest since September 1938.

Shipments to jobbers increased from 14,490,000 gal. in June to 16,968,000 gal. in July, while exports reported to the Bureau of Mines decreased from 8,778,000 to 5,250,000 gal. The average vapor pressure for shipments to refineries decreased, while those for all other movements increased. The weighted average for the month was 17.7 lb., compared with 18.1 lb. in June and 19.4 lb. in July 1939.

Natural Gas

Texas' July Gas Production Higher Than a Year Ago

AUSTIN, Tex.—Production of natural gas in Texas averaged 4,062,680 M.c.f. daily during July 1940, a decline of 34,799 M.c.f. daily from June withdrawals, but 652,062 M.c.f. per day higher than July of last year the Railroad Commission reported in its monthly statement.

The average daily throughput of 2,431,503 M.c.f. for natural-gasoline plants was 183,387 M.c.f. higher than the June rate and 131,338 M.c.f. per day in excess of the July 1939 volume. Natural gasoline recovered totaled 2,318,709 gal. daily, down 15,813 gal. daily from July 1939, but an increase of 108,652 gal. per day over last month. Carbon-black plants manufactured 1,286,416 lb. of carbon black daily as compared with a daily production of 1,286,069 lb. in June 1940, and 1,233,170 lb. during July 1939.

Pipe-line deliveries, up 1 per cent from the June figure and recording a slight gain over July of last year, amounted to 1,115,232 M.c.f. daily.

Gas-Appliance Manufacturers to Hold Annual Meet in Atlantic City, N. J.

The Association of Gas Appliance and Equipment Manufacturers will hold its annual meeting on Monday, October 7, at the Hotel Claridge in Atlantic City, N. J. The meeting will be held simultaneously with the convention of the American Gas Association also to take place in Atlantic City.

The principal event of the meeting will be the election of officers and directors for the next fiscal year. Lyle C. Harvey, president of the Bryant Heater Co., Cleveland, Ohio, is chairman of the nominating committee.

Illinois Natural Gas Lays Lateral at Peoria, Ill.

Illinois Natural Gas Co. will lay 17 miles of 3-in. for a lateral between Morton and Peoria, Ill., and will install control station, meter house, and other operating facilities. The company will also lay a line to Villa Grove, Ill., which will connect with a lateral which serves Champaign, Ill.

Refinery News

New 1,000-Bbl. Refinery Building in Montana

SHELBY, Mont.—The Producers Refining Corp., representing California interests, is constructing a 1,000-bbl. refinery here.

Skelly Acquires East Texas Refining Co. as Subsidiary

Acquisition by the Skelly Oil Co. of 12,499 shares of the capital stock of the East Texas Refining Co. made the latter a wholly-owned subsidiary of the former. Purchase of the stock for a consideration of $325,000 was disclosed in a report to the Securities and Exchange Commission.

Previously the Skelly Oil Co. held 12,499 shares of East Texas Refining Co. out of 25,000 shares outstanding. East Texas operates a 10,000-bbl. per day skimming and cracking plant at Longview, Tex. It has a cracking capacity of 5,000 bbl. per day. The plant is now shut down for overhaul and repair work.

Motor Fuels Enlarging Levelland Refinery

FORT WORTH, Tex.—Motor Fuels Corp. has announced that it will spend approximately $100,000 in an improvement program at its refinery at Levelland, Tex. Present crude capacity of the plant, which was completed about 1 year ago, is 3,500 bbl. daily. This will be increased to 5,000 bbl. daily. Also a new fractionating tower is to be added, two new boilers, the plant's loading facilities doubled and improvements made on cracking facilities. Tom M. Lumly is manager of the plant, which obtains its crude supply from the Slaughter field of Hockley County through a 35-mile 4-in. line owned by an affiliate company, Plains Pipe Line Co.

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Music Mountain Well Capped And Will Be Drilled Deeper

BRADFORD, Pa.—A flowing well, about 3,500 ft. southwest of the nearest producer on the lower end of the Music Mountain pool, has been capped and will be drilled deeper. The well, which is said to be about 6 in. in the Sliverville sand, at 1,700 ft., has a flow estimated at 50 bbl. an hour. The well is on the property of John W. Becker, on Warrant 3410, on land recently leased to Adolph Schorman, Leland Wright, Del Moody and Fred C. Tapp. It is separated from the old Music Mountain pool by a line of seven dry holes along the east line of Warrant 3410.

Michigan A.P.I. Chapter Hears Papers On Technical, Vocational Subjects

Michigan chapter, American Petroleum Institute, met Wednesday, September 11, at Mount Pleasant Country Club. The program, arranged by Sec. Allen Moorow, including a talk on "Echometer Tests in Michigan" by Lee Miller, state Conservation Department petroleum engineer, and on vocational training in oil and gas production, by G. H. Fern, director of the state Board in Control of Vocational Education.

Pipe Lines—Strong Arm in National Defense

(Continued from Page 52)

providing ample crude-oil supplies, and of the refiners in providing gasoline and refined oils of highest quality.

The fact that pipe lines are buried from sight in most localities should add to their value as assets in our national defense, and especially so in case of invasion of this country by air. With our most populous centers and greatest manufacturing districts long distances in many cases from the oil-producing areas, their war and industrial usefulness depends largely upon our great underground pipe-line arteries being kept open and in position to supply the life blood of crude petroleum and its derivatives to the nation's war and industrial plants.

In time of grave national danger it is also believed that our great underground network of pipe lines, touching the majority of our most populous and great industrial sections, could interconnect their facilities at a minimum of time and expense and by joint operation, forgetful of self-interest, serve the national defense more effectively, more safely, more economically than it would be possible for any other form or means of transportation to do.

Petroleum in Defense

Without petroleum products the most powerful armada of the air would be grounded, and the swift armored tanks, trucks, and other motor equipment would have to be replaced with slow-moving mules and horses for motive power. Even on the high seas our means and methods of fighting and transportation would likewise be materially changed without the distillate and fuel oil in ample quantities necessary for the operation of powerful diesel engines. Of most vital importance to all users of machinery, however, whether for war or for industrial purposes, are the lubricants of the petroleum industry.

Whether they realize it or not, therefore, every person in the United States is interested in the efficient, economical and continuous operation of our pipe lines and the prompt and orderly transportation of petroleum products both crude and refined by them. Without the opportunity, however, to serve both producer and refiner from day to day, the pipe lines would have little economic or commercial value to anyone.

Interstate crude-oil pipe lines are common carriers under the law, but experience has shown that few, if any, strictly common-carrier lines have ever been built, for they would be losing ventures unless sufficient crude justifying their operation is tendered them for movement each day and is promptly delivered to responsible consignees at their terminal delivery points. For this reason they are generally regarded as essentially plant facilities and dependent upon the volume transported primarily for their integrated owners.

While interstate crude-oil pipe lines report to, and their rates, accounting and operating practices are at all times subject to the supervision of the Interstate Commerce Commission, it is recognized that such lines have been financed, built, and operated by the petroleum industry itself to provide the only known market for a raw product at the point of production and to enable refineries, whether near by or far away, to operate with economical certainty on an assured supply of crude oil.

Under the advice and leadership of the Interstate Oil Compact Commission it is believed the industry is ready and able to meet not only all needs of the Army and Navy, but of the consuming public without either shortage of supplies or undue increase in prices.

It is our earnest hope today that this country shall be spared involvement in the tragic conflicts in Europe, Asia, and Africa. But if defense of our just rights by armed forces becomes necessary, our crude-oil and gasoline pipe lines, if permitted, are again ready and able, in cooperation with the other branches of the oil industry, to meet the extraordinary demands of war as they did with such efficient, loyal, and nonprofiteering service in 1917, when our nation was in arms.

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1940 A Pipe-Line Year

(Continued from Page 56)

domain. At present, organized opposition is resisting the efforts of the company to complete and operate the pipe line. This opposition works through several bodies which include a legislative committee consisting of various attorneys representing the railroads, a legislative committee consisting of several members of the Railroad Brotherhoods, the Chamber of Commerce of Panama City, Fla., and the mayor and council of Savannah, Ga. It is reported that numerous railroad employes are apparently devoting their full time in a campaign to elect members of the legislature who will oppose the pipe line. While engaged in this activity they are receiving from the railroads their normal wage plus expenses.

Making a bend in construction of Manufacturers Light & Heat Co.'s natural-gas line under construction near Brookville, Pa.

In construction methods employed this year, it is to be observed that stovepiping has been more widely used than ever before. It has even been employed throughout the laying of a 24-in. loop for a natural-gas line. Solid welding of gas lines is being regarded as an important development by several major companies. Coating and wrapping of pipe continues to be done extensively in pipe-line construction.

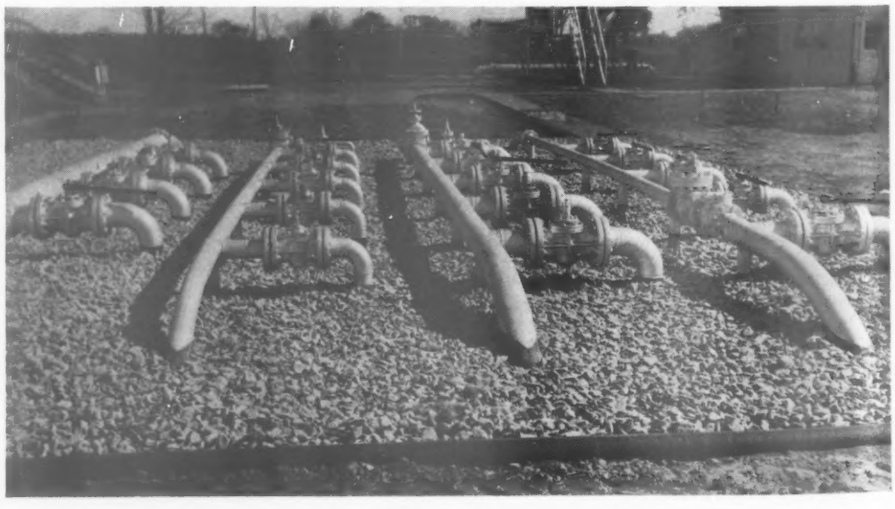
In pipe-line operation there is a noticeable increase in the use of displacement meters on crude oil as well as gasoline lines. Automatic and remote controls are being used to a greater extent for small pipe-line stations. This year considerable attention has been given to methods for synchronizing reciprocating pumps; equipment is used which provides for controlling the speed of the engine by the suction pressure. Similar practices have adopted for compressor control on natural-gas lines. A tendency is to be observed toward the use of higher pressures on lines of all types. Fractionating equipment has been installed recently for operation in connection with the transportation of refined products by pipe line.

Maintenance Work

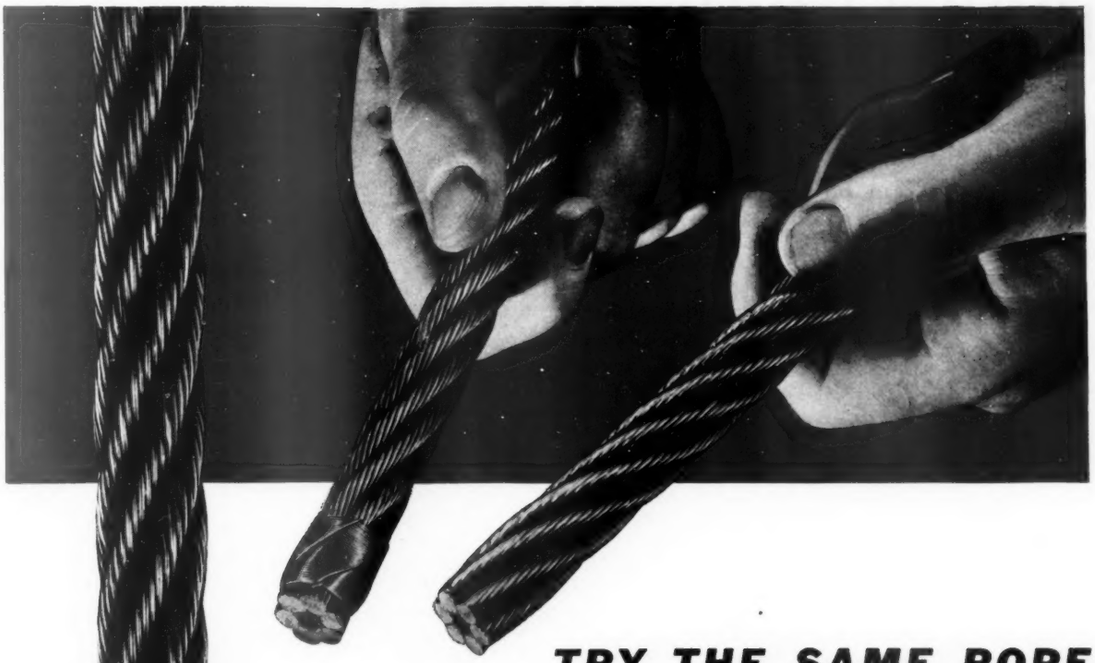
In maintenance work it is to be observed that there is a growing interest in the practice of using water pressure for testing old lines. Cathodic protection is being more extensively employed. Mention should also be made that 1940 marks the close of the 10-year program for studying pipe-line coating, which is sponsored by pipe line technologists committee, American Petroleum Institute, in the course of which samples of pipe and coatings have been systematically examined at 14 sites on pipe lines in different parts of the country.

In reviewing construction work in the last 2 years a definite trend is to be observed toward more gasoline lines. Formerly, about half the mileage laid was for crude-oil lines, with most of the balance in natural-gas lines. The proportion of all construction represented by gasoline lines has been growing steadily in recent years. This year the new gasoline pipe mileage approaches that of new crude-oil lines. Total crude-oil trunk and gathering systems in the United States are approximately 120,000 miles. Natural-gas trunk and distribution lines are 188,000 miles. The gasoline pipe lines have a total of 8,000 miles.

The outlook for the pipe-line industry is one of continued expansion as part of the inevitable progress toward achieving greater national efficiency; furthermore, the place of pipe lines in a farsighted program of national defense insures continued growth for this type of transportation in the period immediately ahead.



Receiving and suction manifold at Harjo station of Mid-Continent Pipe Line Co. near Wewoka, Okla.



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WICKWIRE ROPE

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WICKWIRE SPENCER STEEL COMPANY

PROGRAMS AND MEETINGS

American Gas Association to Meet In Atlantic City, October 7

The twenty-second annual meeting of the American Gas Association will be held at Atlantic City, starting the week of October 7. It is said that the meeting will be the most significant in many years. The program committee, headed by George S. Hawley, of Bridgeport, Conn., has taken into account the pressing national events which are shaping the future.

An important feature of the general session is the annual election of officers.

Following is the program of the Natural Gas Section of the association:

MONDAY MORNING, OCTOBER 7—9:30 O'CLOCK

Ambassador Hotel.

Presiding: Elmer F. Schmidt, chairman, Natural Gas Section, American Gas Association, and vice president and operating manager, Lone Star Gas Co., Dallas, Tex.

Opening remarks by the chairman.

Report of main technical and research committee. Howell C. Cooper, chairman, Pittsburgh, Pa.

Report of subcommittee on gas-well deliveries. N. C. McGowen, chairman, and president, United Gas Pipe Line Co., Shreveport, La.

Report of pipe-line subcommittee. Harry D. Hancock, chairman, and president, Gas Advisers, Inc., New York.

Report of gas-measurement subcommittee. Thomas R. Weymouth, chairman, and vice president, Columbia Gas and Electric Corp., New York.

"Liquefaction, Storage and Regasification of Natural Gas for Peak Loads." Dr. R. W. Miller, research director, Peoples Natural Gas Co. and Hope Natural Gas Co., Pittsburgh, Pa., and John A. Clark, assistant general superintendent and chief engineer, Hope Natural Gas Co., Clarksburg, W. Va.

Panel discussion.

Appointment of committees.

MONDAY AFTERNOON, OCTOBER 7—2:15 O'CLOCK

Presiding: Elmer F. Schmidt, chairman.

Report of industrial natural-gas sales committee. Franklin T. Rainey, chairman, and sales promotion manager, Ohio Fuel Gas Co., Columbus, Ohio.

Report of domestic natural-gas sales committee. Davis M. DeBard, chairman, and vice president, Stone & Webster Service Corp., New York.

Engineers' committee on industrial-gas data. George M. Parker, Mississippi River Fuel Corp., St. Louis, Mo., chairman.

"Methods of Valuation for Rate-Making Purposes—Natural-Gas Production System Properties." Ed C. Connor, consulting engineer, Dallas, Tex.

Discussion: Edgar G. Hill, vice president, Ford, Bacon & Davis, Inc., New York, and Ralph E. Davis, president, Ralph E. Davis, Inc., Engineers, Pittsburgh, Pa.

Summary and panel discussion. Leader: P. McDonald Biddison, consulting engineer, Dallas, Tex.

Election of officers.

Report of resolutions committee.

Oil and Gas Exposition at Charleston Will Be Complete Show

The West Virginia Oil and Natural Gas Association is sponsoring an oil and gas exposition at the municipal stadium in Charleston, W. Va., September 30 through October 5. An announcement from H. A. Wallace, Jr., president of the association, states that displays and exhibits will be progressively arranged from prospecting, through development, transportation, compression, regulation, measurement, utilization, and products. The exhibit will be open from 10 a.m. to 10 p.m. to all those interested and no admission or display charge will be made.

The association's convention will be held during the exposition, the program consisting chiefly of several nontechnical talks, a picnic supper, and entertainment features. Subjects of the papers cover taxes, chemistry of plastic products derived from oil and natural-gas bases, orderly and systematic development of oil and gas fields, and other topics.

Oil and gas-field supply companies are cooperating in the exposition, as well as the Appalachian Geological Society. Appliance manufacturers have agreed to offer handsome gate prizes. The association extends a cordial invitation to attend the exposition.

Appalachian Geological Society Plans Field Trip in Niagara Gorge Vicinity

The Appalachian Geological Society will sponsor a field trip in Niagara Gorge and vicinity on Friday and Saturday, October 4 and 5, for the purpose of studying the outcrops of horizons which have deep producing possibilities in the Appalachian area. Because of the recent interest in deeper drilling in the East this trip should be of interest to those who contemplate development in eastern Ohio, New York, Pennsylvania and West Virginia.

The party will leave the Cataract Hotel at Niagara Falls at 8:30 a.m. on Friday with Dr. C. A. Hartnagle, assistant state geologist of New York, in charge. Transportation will be by automobile. The entire first day will be spent in the gorge and vicinity.

A dinner meeting at the Cataract Hotel on the evening of October 4 will be addressed by Dr. L. C. Snyder, president of the American Association of Petroleum Geologists, and Dr. R. E. Sherrill of the University of Pittsburgh.

Exposures of the Medina formation east of Niagara Falls and in the vicinity of Rochester will be visited on Saturday. Guides will be available on Sunday for those who wish to visit water-flooding projects in the vicinity of Olean and Bradford, the Oriskany fields of southern New York and northern Pennsylvania or outcrops of shallow sands and the Drake well in northwestern Pennsylvania.

CALENDAR

NATIONAL PETROLEUM ASSOCIATION, thirty-eighth annual meeting, Hotel Traymore, Atlantic City, N. J., September 18-20.

SOCIETY OF AUTOMOTIVE ENGINEERS, national tractor meeting, Schroeder Hotel, Milwaukee, Wis., September 24-25.

OIL AND GAS EXPOSITION, sponsored by West Virginia Oil and Natural Gas Association, Municipal Stadium, Charleston, W. Va., September 30-October 5.

NATIONAL LUBRICATING GREASE INSTITUTE, annual convention, Stevens Hotel, Chicago, September 30-October 1.

NORTH AMERICAN GASOLINE TAX CONFERENCE, Whitley Hotel, Montgomery, Ala., October 3-5.

WESTERN PETROLEUM REFINERS ASSOCIATION, regional technical meeting, Wichita, Kans., October 4.

AMERICAN GAS ASSOCIATION, Atlantic City, N. J., October 7-10.

NATIONAL SAFETY CONGRESS, Stevens Hotel, Chicago, October 7-11.

INDIANA INDEPENDENT PETROLEUM ASSOCIATION, fall convention, Hotel Severin, Indianapolis, Ind., October 9-10.

AUTOMOBILE MANUFACTURERS ASSOCIATION, Auto Show, New York, October 12.

SOCIETY OF AUTOMOTIVE ENGINEERS, annual dinner, Hotel Commodore, New York, October 14.

INDEPENDENT PETROLEUM ASSOCIATION OF AMERICA, eleventh annual meeting, Dallas, Tex., October 16-18.

AMERICAN WELDING SOCIETY, annual meeting in conjunction with National Metal Exposition, Hotel Cleveland, Cleveland, Ohio, October 20-25.

PETROLEUM DIVISION, A.I.M.E., October 24, 25, and 26, Tulsa.

WESTERN PETROLEUM REFINERS ASSOCIATION, regional technical meeting, Shreveport, La., October 25.

TEXAS MID-CONTINENT OIL AND GAS ASSOCIATION, annual convention, celebrating Texas oil's forty-fifth birthday, Fort Worth, Tex., October 31-November 2.

West Texas Geologists to Make Field Trip September 28-29

The fall field trip of the West Texas Geological Society will take place in Eddy County, New Mexico, on the last week end in September. It will assemble at the La Caverna Hotel, in Carlsbad, Friday night, September 27.

The theme of the trip is the relation of subsurface formations to surface formations. On the first day, Saturday, September 28, the leaders will attempt to demonstrate the relations between the Yates and Tansill formations and the Capitan, Castile, and Salado. On the second day, September 29, the "Red Sand" keybed at the top of the Queen formation will be studied in both subsurface and surface; and the San Andres problem will be brought up.

The road log, containing 30 pages, 2 illustrations, and a road map, is being sold in advance of the trip for $1.50 which includes the registration fee. The areal geology shown on the road map and numerous measured sections in the log have not been published elsewhere.

The leaders will be Ronald K. DeFord, Neil H. Wills, and George D. Riggs. All reservations should be made through Georges Vorbe, Midland, Tex.

I.P.A.A. to Honor Young Oil Men at Dallas Convention

Evidence of the fact that the independent oil-producing industry is not lacking in the personnel to carry it on and that it has acquired continuity will be seen at the coming annual meeting of the Independent Petroleum Association of America when second and third-generation independents will be singled out for special attention.

Honors have been bestowed in the past at numerous conventions of oil producers upon the veteran members of the industry. At this meeting, which will be held in Dallas, Tex., October 16-18, the younger oil producers, sons and grandsons of independent oil producers, and other young men who have elected to make the oil-producing business their life work, are being invited to be present and to join in the entertainment features now being arranged.

Oklahoma Utilities Gas Division To Meet in Oklahoma City

The gas division of the Oklahoma Utilities Association will meet at the Biltmore Hotel, Oklahoma City, Okla., September 25. Seven papers will be presented, as follows:

"Gas Engines," by E. A. Bartolina, Consolidated Gas Utilities Corp., Blackwell, Okla.

"Duties of a Local Manager," by Clyde Halloren, Gas Service Co., Eldorado, Kans.

"How to Prevent Accidents," by Paul Pinson, Oklahoma Natural Gas Co., Tulsa.

"Natural Gas History," by Ross Stuntz, Cities Service Gas Co., Bartlesville, Okla.

"Gas Air Conditioning," by Don Mayne, Williams Oil-O-Matic Heating Corp., Bloomington, Ill.

"Dealer Aids in Promoting Gas Sales," by W. L. Woodward, Zenith Gas System, Inc., Alva, Okla.

"Time, Temperature and Velocity-Type Booster," by Charles D. Peterson, Fisher Governor Co., Marshalltown, Iowa.

A. F. Potter, division manager, Gas Service Co., Bartlesville, Okla., will preside at the sessions.

PIPE-LINE SECTION

THE OIL AND GAS JOURNAL

Controlled Pressures on Suction Lines... Of Trunk-Line Pumping Stations

By WILLIAM G. HELTZEL
General Superintendent, Stanolind Pipe Line Co.

SINCE 1935 the Stanolind Pipe Line Co. has been developing a practice of carrying a controlled pressure on the suction piping systems of its trunk-line stations for the following purposes:

(*a*) Adequately filling discharge pumps.

(*b*) Providing increased capacities through suction lines and manifold piping installed originally for much lower pumping rates.

(*c*) Overcoming additional friction losses through heat exchangers, installed between the receiving and suction lines, without the customary use of centrifugal booster pumps.

(*d*) Allowing the capacity of discharge pumps to be increased as much as 25 per cent (through increased pump speeds) without any change in the valve areas.

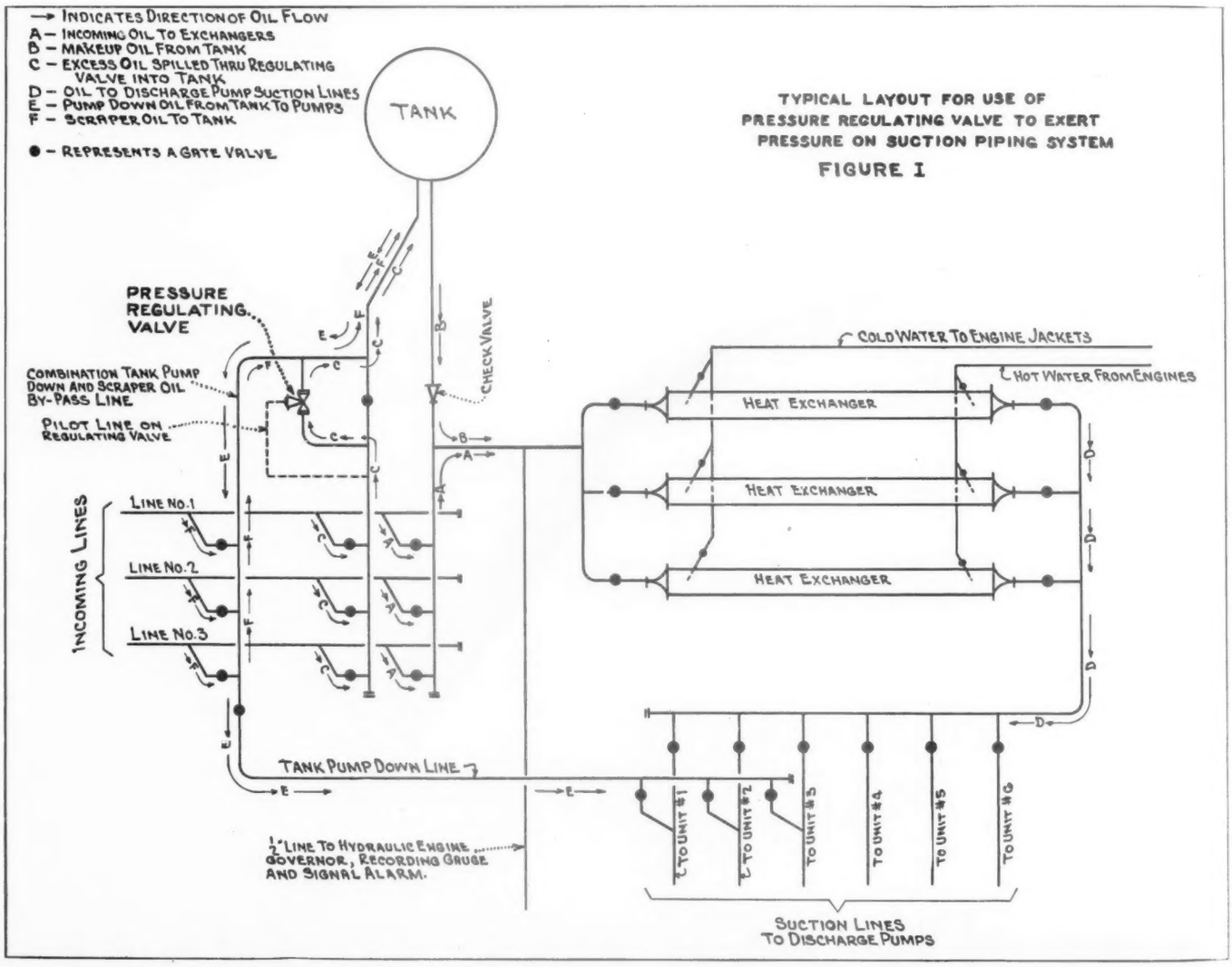
(*e*) Controlling the speed of engines for synchronizing the rate of pumping at the respective relay stations, thereby keeping the crude oil moving through the pipe-line system without oil moving in and out of storage tanks, which in turn reduces evaporation losses.

(*f*) Using originally the suction pressure and later recording tachometers at each relay station as sensitive means of checking for shortages due to leaks or breaks between relay stations.

Since the principle has proved satisfactory in actual operations, its application in each of the cases listed above will be explained in this article.

Adequate Filling of Discharge Pumps

Improper filling of discharge pumps, either on account of insufficient capacity through the suction lines and manifold piping system, or inadequate suction pressure when operating with a low liquid level in the crude-oil storage tanks has been one of the industry's problems in operating pumping stations. Discharge plunger pumps, operating with insufficient pressure on the suction side to overcome the friction losses in the piping, will not fill; consequently, the pump cannot function properly. Under this condition, surges occur in the discharge line; the pump becomes unbalanced in its operation; and its entire mechanism is subjected to excessive strains that cause damage either in breakage or abnormal wear and tear in the parts. Aside from the hazard of pump failures, the maintenance cost becomes inordinately high. A full tank of oil (usually 55,000 bbl. in capacity), exerting a pressure of 10 to 11 lb. by floating on the suction system, has been the customary method of meeting this problem. Ordinarily, the liquid level in the tanks and therefore


→ INDICATES DIRECTION OF OIL FLOW
A – INCOMING OIL TO EXCHANGERS
B – MAKEUP OIL FROM TANK
C – EXCESS OIL SPILLED THRU REGULATING VALVE INTO TANK
D – OIL TO DISCHARGE PUMP SUCTION LINES
E – PUMP DOWN OIL FROM TANK TO PUMPS
F – SCRAPER OIL TO TANK
● – REPRESENTS A GATE VALVE
TANK
PRESSURE REGULATING VALVE
COMBINATION TANK PUMP DOWN AND SCRAPER OIL BY-PASS LINE
PILOT LINE ON REGULATING VALVE
CHECK VALVE
COLD WATER TO ENGINE JACKETS
HOT WATER FROM ENGINES
HEAT EXCHANGER
HEAT EXCHANGER
HEAT EXCHANGER
INCOMING LINES
LINE NO. 1
LINE NO. 2
LINE NO. 3
TANK PUMP DOWN LINE
½" LINE TO HYDRAULIC ENGINE GOVERNOR, RECORDING GAUGE AND SIGNAL ALARM.
TO UNIT #1
TO UNIT #2
TO UNIT #3
TO UNIT #4
TO UNIT #5
TO UNIT #6
SUCTION LINES TO DISCHARGE PUMPS

TYPICAL LAYOUT FOR USE OF PRESSURE REGULATING VALVE TO EXERT PRESSURE ON SUCTION PIPING SYSTEM

FIGURE I

the pressure in the suction system vary with operating conditions and cannot be held constant. Uncontrollable, this method cannot be depended upon for proper filling and smooth operations of the discharge pumps. And from the economic viewpoint, an investment in such a large volume of oil and the concomitant evaporation losses occurring from the storage of the oil cannot be justified in this method for obtaining a few pounds of pressure on the suction piping system. Better results can be obtained through the use of an adjustable pressure-regulating valve, installed on the tank-filling line, which causes the incoming stream of oil to pass directly from the receiving lines through the suction and manifold piping to the discharge pumps. Whatever pressure is required for overcoming the friction loss of the oil passing through this piping system will be maintained automatically by the preceding pumping station. The use of the pressure-regulating valve for this purpose is illustrated in Fig. 1, which shows the interconnection of receiving, tank-filling and suction lines as well as the function of the regulating valve. A manometer, installed in the pump room, is used to check the pressure on the suction side of each pump.

Meeting Increased Capacities Required of Piping Systems

This principle is used to good advantage also in providing sufficient capacity in the manifold and suction piping to meet increased pumping rates without increasing the size of this piping. Assuming the use of tank pressures only, original piping systems become inadequate, or are changed to meet increased pumping-station capacities, obtained by various means—through the installation of an additional pump, replacing small equipment with larger pumping units, changing size of plungers or increasing speed of pumping machinery. Even though new individual suction lines are provided to match an increased capacity obtained by additional pumps or larger pumps as replacements, the capacity of the manifold piping system might be inadequate. Ordinarily, the piping system, not being changed to meet temporary increases in capacities effected by the use of larger plungers or increasing the speed of the pumps, would probably be inadequate in capacity. A piping system, designed for average operating conditions, is usually inadequate for peak pumping rates. Under such conditions, the crude-oil stocks in the pipe-line working tanks are reduced to a minimum, resulting in a minimum suction pressure, when the maximum is badly needed. Without any change in the piping system, the pressure-regulating valve, used to impose on the suction system whatever pressure is required for the increased pumping capacities obtained by any of these means, is a simple, flexible and inexpensive method for meeting this problem.

Installing Heat Exchangers in Suction System

The problem of friction losses in the manifold and suction piping systems has been accentuated in recent years by the use of heat exchangers, installed on the suction lines for cooling the engine water with the crude oil passing through the station. Since the pressure is inadequate, low-pressure centrifugal pumps are required for overcoming this additional friction and keeping the pumps properly filled. Since only 5 to 15-lb. pressure is required for this purpose, the large investment in and the expense of continuously operating the booster pumps can hardly be justified; however, most installations have been made in this manner. Better operating results can be obtained by the simple and comparatively inexpensive installation of a pressure-regulating valve on the tank-filling line, as referred to in a previous paragraph. Fig. 1, representing Stanolind Pipe Line Co.'s practice of installing heat exchangers in the suction piping system, shows the location of the pressure-regulating valve, the installation of heat exchangers and their relationship to the piping system. The flow of oil for various operating conditions is indicated by the lettered arrows, which can be identified by the legend. Increased friction losses through the heat exchangers or piping system, resulting from increased pumping capacities or a change in the viscosity of the crude oil can be met by adjusting the regulating valve to conform with the required pressures.

Increasing Capacity of Discharge Pumps

Another useful application of the suction pressure is found in increasing the capacity of pumping machinery by increased speeds without any change in the valve areas. Ordinarily, the capacity of a pump is increased by replacing smaller plungers with larger ones. However, this means of obtaining increased capacities is limited either by the safe frame load of the pump or the bore of its cylinders. After reaching the capacity determined by these limitations, there is a further possibility of increasing the output of the pump by increasing its speed, provided the valve areas are adequate. By changing only the worn gates, already due for replacement, with new gears having a higher speed ratio, the maximum capacity of certain pumps has been increased 25 to 30 per cent. At the same time, the horsepower of the engine has been increased by supercharging to match the increased capacity of the pump. By carrying sufficient pressure on the suction side of the pump, it can be made to fill and function properly without any change in the valve areas. Without the suction pressure and the pressure-regulating valve, this interesting adaptation of equipment could not have been accomplished.

Controlling Speed of Engines

Ordinarily, spilling appreciable quantities of oil through the regulating valve into the crude-oil working tanks would result from variations in the rate of pumpings between stations. However, as anticipated in the original planning, the suction pressure, being very sensitive to these changes, is used to regulate the speed of one or more pumping units. Thereby a condition of equilibrium between receipts and pumping is maintained. Actuated by this pressure, a suitable hydraulically operated governor (Fig. 2), installed on one or more of the larger pumping units at a pumping station, decreases or increases the speed of the pumping units to conform with these variations, which are inherent in normal operations. One (but preferably two) of the largest pumping units operated in this manner will be adequate for keeping the pumpings between stations properly synchronized. After 3 years, experience shows that through use of this device and principle at two pump stations, very small quantities of oil move in or out of the crude-oil working tanks. In the operations of one station, handling 120,000 to 140,000 bbl. per day, the level of the fluid in a 55,000-bbl. working tank varies less than 1 in. in this period. In synchronizing the pumpings of the relay pumping stations, the suction pressure is automatically held constant.

As a Means for Checking Operations

By shifting the variations from the suction pressure to the speed of the controlled pumping unit, it became necessary to develop the use of an electrical tachometer as a substitute for the recording pressure gage on the suction system, which had been used previously as an indicator of changes in operating conditions. As originally planned, the suction pressure was intended for, and proved to be, a valuable aid in dispatching oil between pumping stations, especially in cases where the hydraulic gradient does not clear the profile of the pipe line.

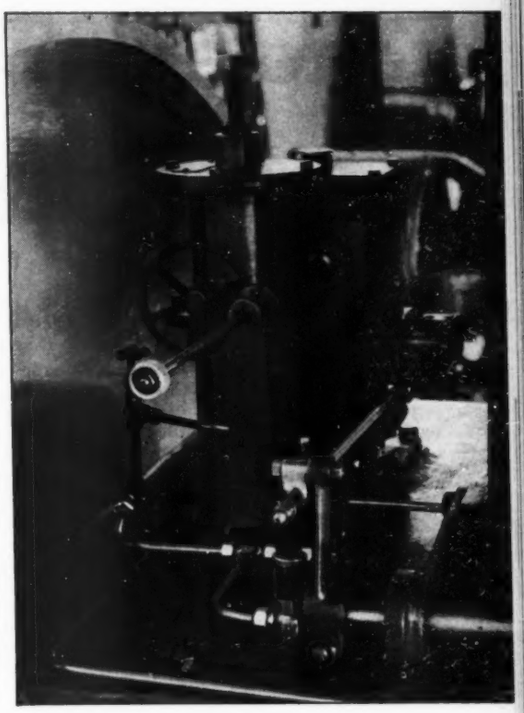


Fig. 2—Hydraulic control for diesel-engine governor

Without the speed-control feature, described in the previous paragraph, the recording pressure gage used in connection with the suction pressure at the receiving station is a sensitive means of determining an oil shortage between two pump stations, either on account of breaks or substantial leaks. Generally, two pumping stations, relaying oil from one to another, are pumping at the same rate and under this condition the suction pressure remains practically constant. But an appreciable loss of oil between stations will be indicated by a drop in the suction pressure at the receiving station. Ordinarily, large leaks and breaks become known by a drop in the discharge pressure; however, leaks or breaks at the far or low-pressure end of the line might not be indicated in the discharge pressure, and this would be especially true in the case of breaks in sections of lines which, on account of the hydraulic gradient, do not run full. Assuming that the two pumping stations are running at about the same rate, breaks and leaks that might not be indicated in the discharge pressure could be detected in the suction pressure at the receiving station. Also, without a control on the engine speed, the low-pressure gage used in connection with the suction pressure is a good indicator of a change in the pumping rate of either station, which in turn signifies some change in operating conditions at either station. An increase or decrease in the speed of the machinery at either station is represented by corresponding changes in the suction pressure at the receiving station. Likewise, anything in the operations at either station, such as engine trouble, improper filling of pumps, valves sticking open, or increased generator loads, which affect the pumping rate, will be reflected in the suction pressure at the receiving station. Such information, serving as a warning of changed operating conditions, enables the men on duty to investigate the cause promptly. But under the improved method of maintaining a constant pressure and varying the speed of the controlled pumping unit, this information, used for dispatching purposes, must be obtained from an electrical recording tachometer used in connection with the engine or engines, the speed of which is controlled by the suction pressure.

Efficient Communication System For Pipe-Line Operation

By HEZZIE CLARK
Electrical Engineer, Humble Pipe Line Co.

A RELIABLE communication system has always been necessary for the successful operation of large pipe-line systems and producing areas. However, until comparatively recent years, the communication system was very simple, as it consisted largely of long lines following the general course of pipe lines, with loops or taps into each relay pumping station. The circuits usually were simplexed for the simultaneous transmission of one telephone conversation and one telegraph message. Numerous telephones and several telegraph instruments, operated in series to ground, were usually connected to the lines at various stations, making this type circuit a "party line" from both a telephone and telegraph standpoint. Most of the oil dispatching was handled by telegraph, leaving the telephone circuits available for the handling of business that required discussion of operating problems.

In the early years of development, one line from general headquarters to each area was sufficient to provide service for successful operation. However, at that time, supervision was not centralized, and accounting and other operating regulations were not sufficiently numerous to require extensive communicating facilities.

As time passes, oil companies are required to reach out to greater distances and develop other areas in order to maintain a supply of oil. Numerous new operating rules are made, additional safety measures are adopted, governmental and other regulatory bodies enact numerous restrictions and regulations, all of which make accounting and proper supervision of field operations complex to such a degree that the old communication system could not provide the facilities required at the present time.

The oil industry in general has made phenomenal advancement in the utilization of scientific equipment and principles in its various operations during the past 20 years, and the communication system must keep pace with the progress of company expansion and provide additional circuits.

Terminal frame where long lines terminate (left, rear) and some special equipment including repeaters, carrier terminal sets and electric-wave filters

both telephone and telegraph, between the general office and outlying division offices. These circuits must be through circuits; i.e., direct from point to point without intermediate telephones or way stations, in order to provide immediate service of high quality.

The pair of wires constituting the physical circuit will conduct only one conversation (at voice frequencies) at a time as the human voice produces frequencies of a very complex nature and requires a band width of approximately 20 to 5,000 cycles to cover the frequencies produced by the various pitches of speech. The lower frequencies that produce the bass component are most important for volume and the higher frequencies are most important for articulation. A normal conversation, however, does not require a band width greater than 200 to 3,000 cycles to be satisfactorily intelligible; therefore, all frequency space above 3,000 cycles may be separated from the band below 3,000 cycles and utilized for the transmission of other circuits by the use of carrier frequencies, which are modulated with voice, Morse telegraph, teleprinter impulses or other desired signals. The modulated carrier circuits and the physical voice circuit are separated by electric wave filters which effectively block off the circuits in channels of definite band widths.

Conserving Channel Space

In order to conserve channel space and permit more circuits to be transmitted over a pair of wires and keep top frequencies to a minimum, only one side band for each channel is transmitted, the carrier and other sideband being suppressed. The carrier must then be added at the receiving end where demodulation takes place and the modulating frequencies are converted to their original state of intelligibility and become other communication circuits at the equipment terminals.

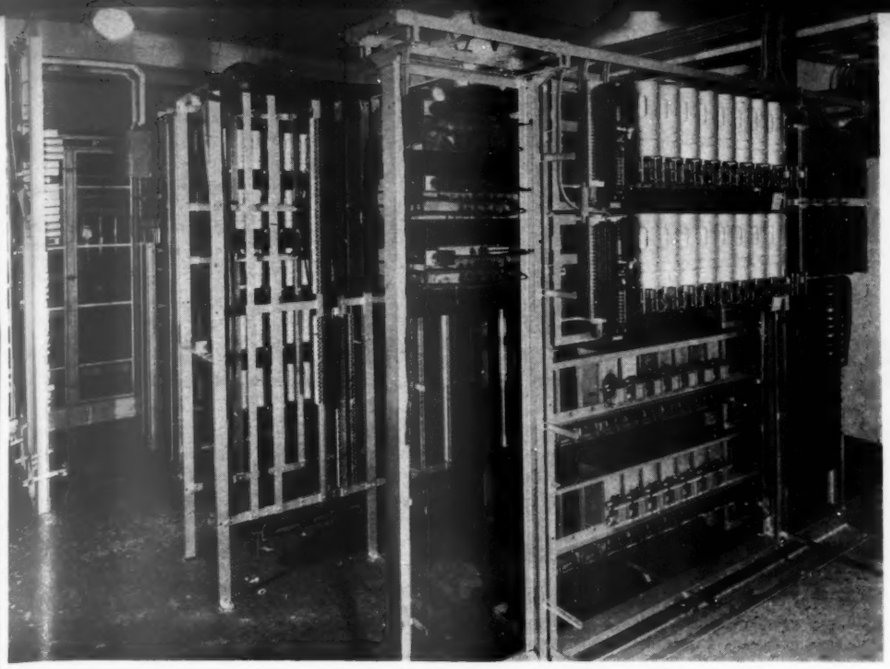
Line attenuation increases as frequency increases; therefore, lower frequencies do not require as many repeater stations for a given length of line as do the higher frequencies in order to maintain the desired level at the receiving terminals; also, the higher frequencies will radiate or crosstalk more with other circuits of the same frequency on other wires than will the lower frequencies.

When two or more carrier channels of the same frequencies are used on the same pole line, it is often necessary to retranspose the wires in order to reduce crosstalk to a minimum. This often means the addition of several hundred more transpositions and more accurate location of the transposition points.

The signal level to the line must be limited in order to prevent interference to other circuits and the direction of transmission of other carriers considered.

Where single sideband suppressed carrier transmission is used, requiring separate oscillators at the transmitting and receiving ends, the oscillators must be stable as an appreciable drift in one of the oscillators will cause distortion.

In cases where several frequencies are desired at one point, and a definite separation is essential, a tuning fork may be used to drive an ampli-



Automatic switching equipment, handling all interoffice and outgoing local calls. Such equipment also is used for automatic service over long lines

fier and produce a fundamental frequency which, after undesired harmonics have been eliminated, may be used to excite a harmonic producing circuit which will produce harmonics of even amplitude up to more than a hundred multiples of the fundamental frequency. All frequencies thus produced have a definite relationship and will be as stable as the fundamental frequency, which is determined by the temperature coefficient of the tuning fork.

Tuning forks can be secured with a temperature coefficient of one part to a million per degree Centigrade, if such accuracy is required, at little more cost than a fork with 12 parts to a million per degree Centigrade, but such a high degree of stability is seldom necessary.

The various frequencies are separated by band pass filters and each is directed to its allocated modulator and/or demodulator.

The design, construction, and maintenance of modulators, demodulators, amplifiers, oscillators, wave filters, and other component parts of carrier equipment requires a much higher degree of knowledge and skill than the general run of older types of communication equipment, as in the design of such equipment the use of numerous complex mathematical formulae are necessary and a much broader knowledge is required of the function of vacuum tubes and behavior of frequencies of a higher order than those encountered in voice frequency transmission.

Carrier Current Circuits

The development of carrier current equipment has required years of research to bring it to its present state of perfection and research is still carried on in order to utilize a greater portion of the frequency spectrum for providing more channels for communication.

One of the advantages of carrier current circuits, not heretofore mentioned, is the complete privacy it affords between terminals as it is not possible to intercept a conversation on the line with an ordinary receiver. This also makes the use of carrier circuits for through service most desirable, while the physical circuit is more applicable for service to way stations.

When one pair of wires becomes so important that several circuits are dependent on its operation, better maintenance must be provided, both on the line and on the equipment at terminals. Certain restrictions are necessary to prevent field men, not familiar with the operation of such equipment, from connecting any equipment or making any changes in wiring that might upset the proper function of the special equipment. This explains why telephones or other equipment can not be installed promiscuously on the circuit, as was done in previous years.

Oil companies are required to build up a huge communication system, consisting of thousands of miles of line, as their pipe lines traverse sparsely settled areas and many stations and offices are located in places several miles from any commercial telephone or telegraph system. Therefore, some of the major oil companies own systems many times larger than some of the independent commercial companies and have much more modern equipment.

Location of Personnel

It is not only necessary that skilled equipment men be maintained by an oil company with a large communication system, but it is also necessary to station numerous linemen (with automobiles) at strategic locations to maintain the line wires. At certain important junctions wire chiefs, with measuring instruments, are provided to facilitate line repairs and make transmission tests to insure that terminal equipment and intermediate repeaters are kept adjusted and functioning properly and the transmission level is kept normal. Division foremen are necessary to inspect equipment and supervise maintenance work.

Some oil companies maintain a laboratory where technical men are employed to carry on a certain amount of research, test, and repair equipment, and furnish field men with technical advice when needed.

The communication department may be called upon to provide communication facilities for various departments of its company and affiliated companies and may find that drilling operations may be conducted in locations where pole lines could not be built and cables would not be practicable. Such a condition exists where drilling is being carried on in tidewater, several miles from the mainland. Communication between such locations and the base office is very essential for safety reasons, as well as efficiency of operation and since radiotelephone equipment is now available to provide communication through a land station, owned by and connected to a commercial telephone system, providing long-distance telephone service to any point desired, this provides very satisfactory service.

Dispatching Personnel

The transportation of oil through pipe lines requires a dispatching personnel similar to that of a railroad system, as it is necessary to know at all times where the oil is being delivered and when a different grade of oil will reach a certain tank farm in order that tanks may be switched and the different grades be kept separated. In order to dispatch the operation of a large system, several dispatchers may be required at one location since they must record the oil level in all working tanks over the entire system, collecting such gages by telegraph and telephone from relay stations and division offices. They also supervise the speed and operation of pumps in outlying districts, as well as keep a check on line pressures and oil deliveries to be sure that a line does not become broken or leak, with a resultant loss of oil and damage to property. The dispatchers must have communication to all parts of the system at all times and in order to provide such dependable service the supervision of the entire personnel of the communication department must be centered in the general office where the best coordination is possible.

Few people outside of the oil industry, and few employes of the oil industry, realize the magnitude of the communication system or its importance to the operation of an oil company but, without one an oil company would be in the same shape as an army trying to carry on a major engagement without communication.

Some of the older types of equipment in the background and special carrier-terminal equipment at left

Safety Practices in Testing High-Pressure Gas Lines

By D. K. STEPHENS
Superintendent of Pipe-Line Department,
Panhandle Eastern Pipe Line Co.

Above: Gage reader with portable telephones at gate-valve gage line.

Right: Completing repair. Loose dirt has been pulled into hole ready to center-weight joint before loading with gas

THE static testing of high-pressure natural-gas lines of large diameter that extend for hundreds of miles across country, going under railroads and highways, passing close to farm houses, villages and cities, is a hazardous task at all times regardless of location. This is so especially when a line has been in the ground for a number of years and has never been tested to its theoretical or maximum working pressure. Such tests are sometimes postponed necessarily through lack of facilities to obtain the required pressures at time of construction. Consequently, lines are often operated for a number of years at pressures under ultimate-test requirements and, as facilities are added, a maximum working-pressure test becomes advisable.

This article deals only with those safety practices which have been developed in the testing of some 1,400 miles of 22 and 24-in. lines in the last few years without accident. These safety measures have been summarized and are presented to those interested for what assistance they may be in reducing to a minimum the chances of accident to those engaged in making the test, to those who live and work adjacent to the pipe-line rights-of-way, to the traveling public, and to contiguous property, as well as for the protection of service to the customer in case of rupture in pipe or fittings.

If at all practicable, tests should be made in early spring while grass, grain, and row crops are green. Tests carried out in grain countries during the summer months should be delayed until harvest is completed because of fire hazards and possible large resultant damages. For the same reason fall tests are to be avoided in so far as possible. Winter tests are usually impracticable due to load and unsatisfactory working conditions.

A crew of 16 to 20 men, 75 per cent of whom should be experienced and preferably members of regular maintenance gangs, are used to make the test. They are fully instructed as to manner in which the test will be made, the pressure to be obtained and just what their respective duties will be. Written schedules are given each member of the test crew indicating his exact location during the test, whether it be railroad or highway crossing, gate valve, or other essential point, and his exact duties in case of blowout. Included in these schedules are details of the section of line he is to walk following attainment of test pressure, the distance he is to stay off line while walking and the point to which he is to report following coverage of his section. Schedule also shows where each truck, pickup and car will be located and where the drivers are to set down and pick up men walking the line after test pressure has been reached. In this manner a full test section of line can be covered in 15 to 20 minutes.

Testing Large-Diameter Lines

The safest method of testing large-diameter lines with gate-valve spacings of 8 to 10 miles is the pressuring of one gate-valve section at a time. This procedure is slightly slower than testing two or more sections at a time providing nothing happens during the test, but it has the advantage of keeping men and equipment more available in case of trouble or rupture, permits better control over what is going on along the right-of-way while the section is being tested and does not require as large a crew. Three to five sections can be tested in this manner in an 8-hour day if no trouble is encountered.

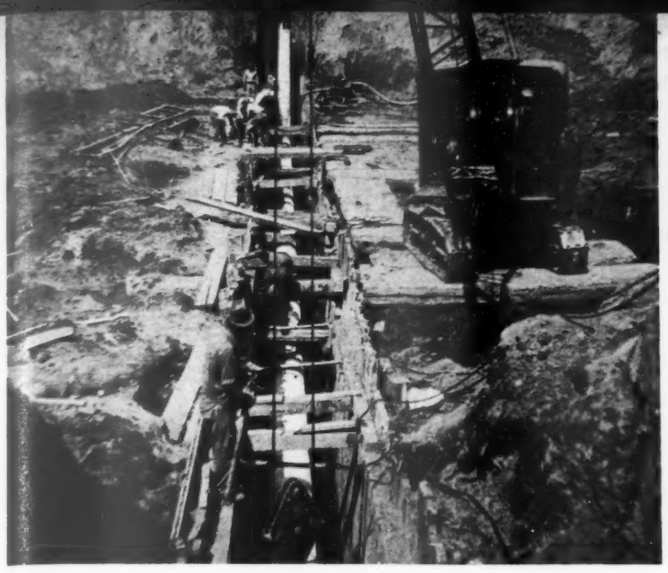
The equipment used in the testing of high-pressure lines consists of three pipe-line trucks with winches, two of which are loaded with all the emergency equipment and material necessary to make any kind of repair. Included in these loads are bending blocks and other fire-bend equipment and one other piece particularly worthy of mention. This is a common farm plow, rigged for pulling by truck and is especially useful in making available in rapid time sufficient material for back fill. All back fill is usually lost at a blowout point and much labor and time can be saved in the repair by plowing crater edges and slipping in enough back fill for weighting replaced pipe sections. Permanent back-fill repairs can then be made after line is placed in service. The third truck with trailer carries three joints of extra pipe from stock. The welding machine is trailed behind a pickup on which oxygen and acetylene equipment is loaded. A small hot paint kettle, a slow fire under pot, is trailed by second pickup. A third pickup carries two drums of water, gunny sacks and fire extinguishers. Two or three passenger cars are usually available and come in handy in case of trouble or in picking up line walkers.

Testing Lines on Utilities Properties

All railroad, pipe-line, gas-distribution, telephone, power and other service companies are notified of the date and hour test is to be made on the section of line crossing their respective properties. Train schedules are obtained from the nearest railway agent before a test is made on a section crossing a railroad. Care should be taken to check on extra as well as regular trains. The time of test is then determined by picking out an interval between trains which gives sufficient time to start and complete the test. If sufficient interval is not available, or if for some other reason the completion of test is delayed after being started, then the raising of pressure should be discontinued 15 minutes before a train is due and not resumed until train has cleared crossing. The state Highway Department is also advised of the test and crossing location on numbered state and federal highway crossings. Subsequently all parties are notified as soon as test is completed so that any men they may have out as guards may be released. Distributing companies and other customers taking gas from the section under test are advised and a guard stationed at each main-line connection. Lateral lines are packed prior to test and guards remain in vicinity of the takeoffs until test is completed.

Company telephone linemen place drops at company telephone poles nearest all railroads, highways and important county road crossings, in addition to gate-valve locations and other points where guards are considered necessary. Extension cords are run from the drops to points 400 to 500 ft. off the pipe line and to the windward of it. At least two guards are placed at these locations, one of whom remains constantly at his portable telephone during the test. Good communication is essential in carrying out all line tests. In testing lines, not paralleled by company-owned communication systems, arrangements may be made with local telephone systems for essential drops and augmented by prearranged signal systems if necessary.

(Continued on Page 110)



Installing 22-in. pipe line at outlet channel crossing

Ditching machine passing through a walnut grove

Relocating Transmission Line In Flood-Control Area

By S. S. DONALDSON
Manager, Newhall Division, Southern California Gas Co.

THE program of Los Angeles County for the control of flood water includes the construction of a retarding basin in the Los Angeles River upstream and west from its crossing of Sepulveda Boulevard and north of Ventura Boulevard. The dam, when constructed, will back water over the original location of our 22-in. line No. 120 on Haskell Avenue. This is one of the main transmission lines from Newhall to West Los Angeles station and in order to guarantee uninterrupted delivery, it was necessary to relocate the line.

The United States engineers have undertaken the construction of the dam, using federal funds, and the work is now in progress.

In order to provide a better position for our line, a right-of-way was secured along the downstream toe of the dam, and 10,054 ft. of 22-in. pipe was installed, beginning at Victory Boulevard and extending in a general southerly direction to a point on Haskell Avenue, about ⅛ mile north of Ventura Boulevard.

The job was divided into two sections, due to the difficulty in the installation of approximately 700 ft. of pipe under the spillway and outlet channel from the dam. Approximately 500 ft. under the spillway had to be installed immediately after the dam construction work was started, as one of the first operations was the pouring of a concrete slab over the location selected for the pipe line. The pipe for this section was available from storeroom stock, and was installed the latter part of May. The balance of the pipe was ordered from a mill in the East, and was delivered direct to the Industrial Engineering Co. for application of coating, and then hauled to the job.

A ditch approximately 150 ft. wide and 25 ft. deep was dug by the dam contractor across our right-of-way just south of the spillway, which later will be lined with concrete and used as an outlet channel from large openings near the bottom of the dam.

Above: Blowing dirt from the line at completion of job

Left: Pipe line crosses over culvert on Victory Boulevard

Below Water Level

As soon as this channel was dug it was necessary for us to install our 22-in. pipe at a depth of approximately 8 ft. below the bottom of the excavated channel. As the normal ground water level in this area stands at approximately 20 ft. below the surface, the bottom of the channel was in water and mud, and in order to place our line another 8 ft. below this, it was necessary to drive sheet piling before the ditch could be dug. Two rows of sheet piling approximately 160 ft. long and 5 ft. apart were installed across the channel. This piling consisted of 3-in. by 12-in. planks, 12 ft. long, with tongue-and-groove joints on the edges. They were driven by a drop-hammer pile-driving rig on a small power shovel which was rented for the job. The bottom of the channel was so soft that large wooden mats had to be used to support the weight of the shovel.

After the piling was all driven, the upper ends were braced with 6 by 12-in. timbers. The mud between the rows of piling was removed with a clam-shell bucket and additional timbers, 6 by 6-in., were installed to brace the lower ends of the piling. In order to clear the ditch of water it was necessary to keep two pumps going 24 hours a day.

As soon as the ditch was completed, the pipe

was placed in position between the trench braces, using a power shovel and a side-arm tractor to handle the pipe. The pipe was then blocked about 2 ft. above the bottom of the ditch, so that it could be welded and Somastic coating applied to the field joints.

Twenty-degree factory bends were installed as vertical angles with risers at both sides of the channel. Bull plugs were installed at both ends and the entire string was tested with air at 100 lb. pressure. When the test was completed the pipe was lowered to its final position and covered with sufficient dirt to displace the water in the ditch. The piling was then removed with the power shovel and the backfilling was completed.

It Didn't Leak

The ditch for the line across the spillway, which later was covered with an 18-in. slab of concrete, had to be backfilled according to government specifications for this class of work. The dirt for backfilling had to be spread in 4-in. layers and tamped with pneumatic tampers. This was a long and costly operation.

The remainder of the line, approximately 9,340 ft., was normal pipe-line construction, with the exception of the following: The pipe was too heavy to make rolling welds, due to the coating which was ¾-in. thick, hence all welds were position welds over the ditch. An inverted "U" section was installed over the top of a large concrete culvert on Victory Boulevard just east of Haskell Avenue. Thirty-degree factory bends were used for the vertical angles on both sides of the cul vert.

Seventy-eight feet of 26-in. pipe was installed as casing under a proposed railroad crossing where the Southern Pacific Railroad line will be relocated just south of Victory Boulevard.

Two "A" frames, fabricated on the job from 4-in. and 6-in. used pipe, were installed where the line crosses the Los Angeles River channel, near the south end of the line. This channel is to be filled in when the dam has been completed.

The line was tested in long strings on top of the ditch, before the Somastic coating was applied to the field joints. Upon completion, the entire line was given a final 48-hour test with air at 100 lb. No leaks were found on either test. When the final tie-in was made, the north end was tied in first and then blown with gas to remove any dirt or other foreign substances from the line. The south end was then tied in and the line put in service June 12, 1940.

Kansas Pipe Line & Gas Co.'s compressor station at Stockton, Kans.

Kansas Line Provides For Peak Loads

By REECE E. McGEE
Vice President, Kansas Pipe Line & Gas Co.

THE Kansas Pipe Line & Gas Co. has extended its lines this summer some 25 miles to serve McCook, Neb., through relocation of one of its compressor units. The manufactured-gas system located there was recently acquired by the Aksarben Natural Gas Co. It is now converted to natural gas. The extension will also serve Indianola and Bartley, Neb. Since it may be of interest, an account is presented to show some of the methods of assuring the company a satisfactory margin of capacity on peak days for handling our increasing loads.

The company operates some 635 miles of 8, 6, 4 and 3-in. main line and laterals. The company purchases its gas at a central gathering point in the Otis field in Rush County, Kansas, taking the gas into its lines at a pressure of about 600 lb. on peak days. This is the working pressure for which the line was originally designed. The company has the problem of meeting an anticipated peak day this coming winter of nearly 12,000,000 cu. ft. through a 6-in. line. Loads on several 4 and 3-in. laterals are also increasing substantially. This situation adds to the problems. Means are being prepared this summer in five different ways to be amply able to meet all requirements of domestic customers on peak days.

The program being carried out is as follows:

1. Increasing compressor capacity at one of the present plants and installing one new compressor station.

2. Replacing a short section of 6-in. line with 8-in., using the 6-in. thus taken up to loop a few miles of the main line between compressor stations.

3. Constructing a butane standby plant at Oberlin, Kans., which is at the end of one of the laterals. The plant will have a capacity of about 500,000 cu. ft. a day of high-B.t.u. gas, and sufficient storage capacity for 3 days continuous operation.

4. Equipping the existing water gas set at McCook, Neb., which is the terminus of another lateral, so that it can serve as a standby plant and manufacture a high-B.t.u. gas with a capacity of about 500,000 cu. ft. a day.

5. Putting into effect a general interruptible rate which it is believed will be sufficiently attractive in the communities served at retail in Kansas so that various court houses and school houses and other public buildings using an aggregate of about 500,000 cu. ft. of gas a day on a peak day, will at their own expense install standby equipment because of the savings offered them. The reduced rate will retire the cost of such standby equipment in from 3 to 4 years.

It will be noted that the last three named methods alone will have the effect of increasing peak-day capacity, to take care of domestic business, by about 1,500,000 cu. ft., or about one-eighth of entire anticipated peak-day demand. The cost of such increased protection will be very nearly nominal.

Combating Corrosive Conditions

In maintaining the system the company has been confronted with a very interesting corrosion problem in the Platte Valley of Nebraska. The soil is exceedingly sour and generates a high ground voltage; also the line parallels the Union Pacific Railroad for 130 miles, which is equipped with electric signals.

To combat corrosive conditions, arising from this situation, the company has installed wind and motor-driven generators, which have checked corrosion very satisfactorily. There is a cathodic crew consisting of three men, equipped with all the necessary instruments for taking ground potentials and checking current distribution on generating units.

Most of the company's lines were constructed about 4 years ago. It was contemplated that the load would gradually increase and additional communities be taken on, but, as in almost every system exact future distribution of the load could not be accurately determined. The company's president, L. E. Fischer, feels that the most economical mode of construction for the company's requirements is one which holds down the size of the lines to small diameters. It is considered to be desirable that the company operate at pressures as high as the limited load would justify. This reduces the initial investment. Units are installed in this program which are of a type which can be moved if desired, without the loss of much investment in foundations.

This policy has been eminently successful in the case of the Kansas Pipe Line & Gas Co. The system now has close to 10,000 customers. After adding the cost of the improvements listed above, the company's investment per customer to reach the respective borders of the 56 communities served, scattered along 635 miles of main lines and laterals, is about $200.

When one considers the very thinly populated territory in North Central Kansas and southwestern Nebraska through which the company's lines pass, and the small size of most of the places served, it is believed that this figure is somewhat of a record in low investment per customer

Study of Internal Corrosion in Horizontal Gas Engines

By WALTER H. DAVIDSON
Superintendent, Compressor Stations, Natural Gas Pipeline Company of America

THE following discussion is limited to corrosion in the water-circulating passages of 24 by 36-in. twin-tandem double-acting gas engines. The units under discussion are cooled by continuous circulation of water from an open cooling system. The cooling water is directed through the engine in three streams, namely, cylinder-jacket water, exhaust-valve water and piston-rod water.

After several years of continuous operation on gas-pipe-line duty, using over 60 of the 24 by 36-in. size units, numerous forms of water corrosion have developed. Corrosion generally has been found in engine-cylinder jackets, exhaust-valve water jackets, as well as the interconnecting water piping. Although this type of corrosion has been of some concern, this article will describe a particular type of corrosion as found in the water-cooled pistons and rods.

On the 24 by 36-in. horizontal twin-tandem unit the power piston is of cast iron pressed on to a forged-steel piston rod of approximately 7-in. diameter. The rod is hollow bored from each end toward the piston to allow for a water course $3\frac{5}{16}$ in. in diameter. At the exact center of the 13-ft. rod a solid metal dam is left for a horizontal distance of $1\frac{1}{4}$ in. The dam or obstruction thus directs the water coursing through the rod in and around the piston. The inlet water is piped directly from a header into an air chamber, thence through a reciprocating telescopic tube attached to the inboard crosshead. This system is illustrated in Fig. 1.

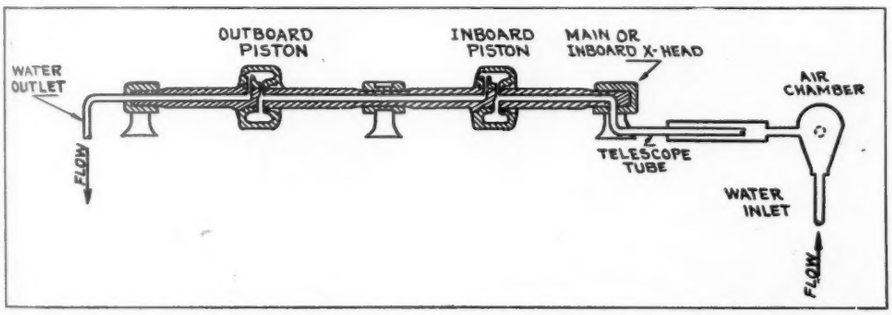


Fig. 1—Cross-section of piston rod and water assembly showing water course through the rod

In the course of periodic engine overhaul observation disclosed a peculiar type of corrosion that was progressing within the water course of the piston rods. The initial observation was made by seeing daylight straight through the bore of the rod. Closer inspection by light directed against the center dam disclosed severe pitting and, in some cases, complete disintegration of the partition. The metal had the appearance of a sponge. All power piston rods were closely inspected and the same characteristic corrosion was prevalent throughout 10 operating plants although not so severe as on the piston rods in service at that plant where the discovery was first made.

If the center dam in the piston rod was removed, the majority of the water used for cooling the pistons would bypass straight through the rods, causing improper piston and ring cooling. The fact that corrosion had progressed to the point to allow the piston water to so bypass was of first concern. Further investigation was made by removing the piston from one of the rods which by inspection appeared to have suffered the worst corrosion. Upon removal of the piston the steel rod was found much more corroded than had been determined through the other method of inspection. Other pistons were removed from rods showing internal corrosion, and in all cases the corrosion disclosed was more severe than could be determined with the piston in place. In several instances corrosion had progressed to the point that 25 per cent of the cross-sectional area of the rod through the center section had been eaten away. As much as 22 cu. in. of solid metal had been removed. In addition to the corrosion as mentioned, deep channeling was apparent at the top of the rod bore. The problem immediately became related to the reduction of rod strength and operating safety factors.

Those rods having a severe degree of corrosion were immediately removed from service. Others found with a minor degree of corrosion or pitting at the center dam were successfully welded, using the arc method. The welding was done with the piston in place by standing the rod vertically and using an elongated electrode. An exhaust fan was utilized to remove the smoke and allow the operator to direct the electrode. No great quantity of welded metal was deposited in any of the rods so repaired.

Further investigation into more than 250 power piston rods all of the same size and subjected to the same duty disclosed several interesting facts. The type of corrosion found in all of the rods inspected was the same throughout. The degree of corrosion varied considerably. The center dam was corroded and always on the side toward the inlet water. The rod channeling was invariably on the top of the rod and in the same general relative position, that is, on the inboard or water-inlet side of the piston. The channeling also ran for approximately the same distance in length even though the depth and width of the channel might vary. All of these facts led to the assumption that there was a mechanical factor involved as well as the chemical factors. The degree of corrosion could be explained by the difference in quality of the waters used at the several locations.

Attempts at Solution

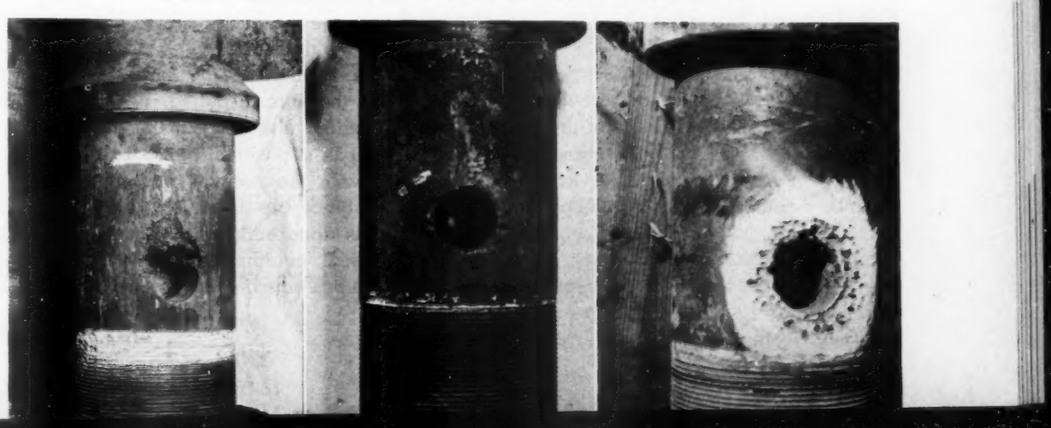
The solution of the problem was directed toward its various aspects. Several inhibitors based upon the protective-film principle were placed in use. In time it was found that such inhibitors did not afford any material protection in the water course through the rods particularly where the turbulence was highest and the corrosion was greatest. Thought was directed toward protecting the rod water course by means of corrosion-resistant material. Such materials included the use of stainless-steel lining, cadmium plating, tin plating and rubber lining. Most of these ideas were discarded as either impractical from an economic application or from the heat-exchange standpoint.

Along with the above, more study was directed toward eliminating the problem at the source; that is, to eliminate the mechanical factors causing the accelerated corrosion and/or arrest the corrosiveness of the water by some pretreatment.

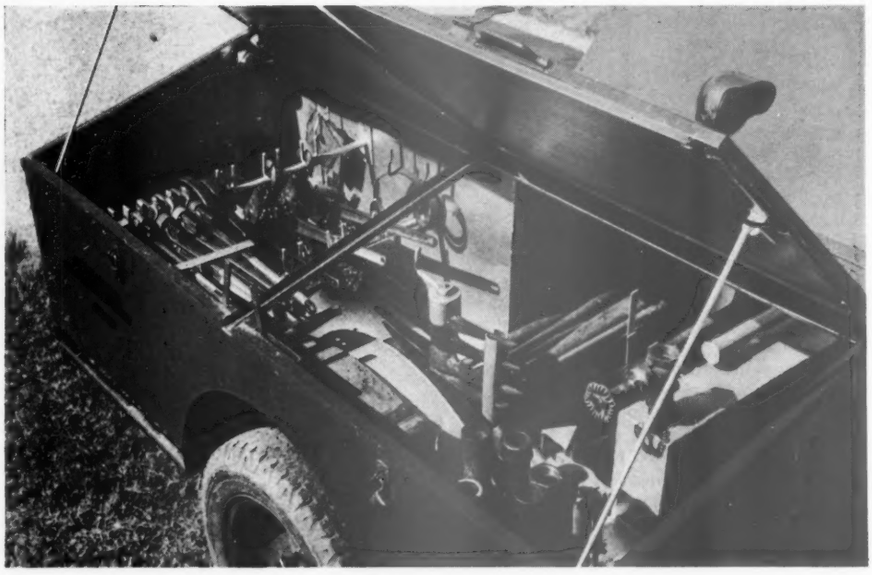
It was known that water at those points where the rod corrosion was most severe contained hydrogen sulfide, which no doubt increased the tendency to corrode, particularly in the presence of oxygen with which the water was laden after being passed over the cooling towers. It was further felt that hydrogen sulfide or ary other corrosive elements in the water might be inhibited by the removal of oxygen. Oxygen removal had been practically accomplished in other installations by submitting the water to a vacuum. The oxygen removal could also be accomplished by using natural gas to displace oxygen. The use of natural gas appealed because of the economical factors involved. As all of the cooling water was circulated over an open cooling tower it became neces-

(Continued on Page 112)

Fig. 2—Corrosion at water inlet of power piston rods of compressor units



Practical Suggestions



Short, Illustrated Kinks On Pipe-Line Operation And Maintenance . . .

. . . *edited by* PAUL REED

Maintenance Gang Tool Trailer

To increase the efficiency of pipe-line maintenance gangs, a company has built tool trailers of a type designed to transport equipment in such a way that it is readily accessible at the place where work is to be done. Racks for wrenches, picks, and pipe fittings are made so that these are held snugly in place in spite of jolting over rough roads. The housing for the trailer has been made weatherproof. It is equipped with electric brakes and a turn indicator.

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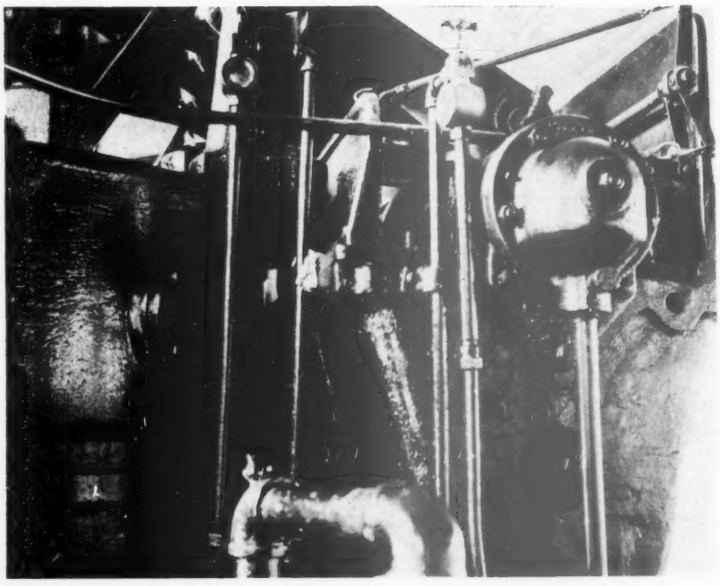
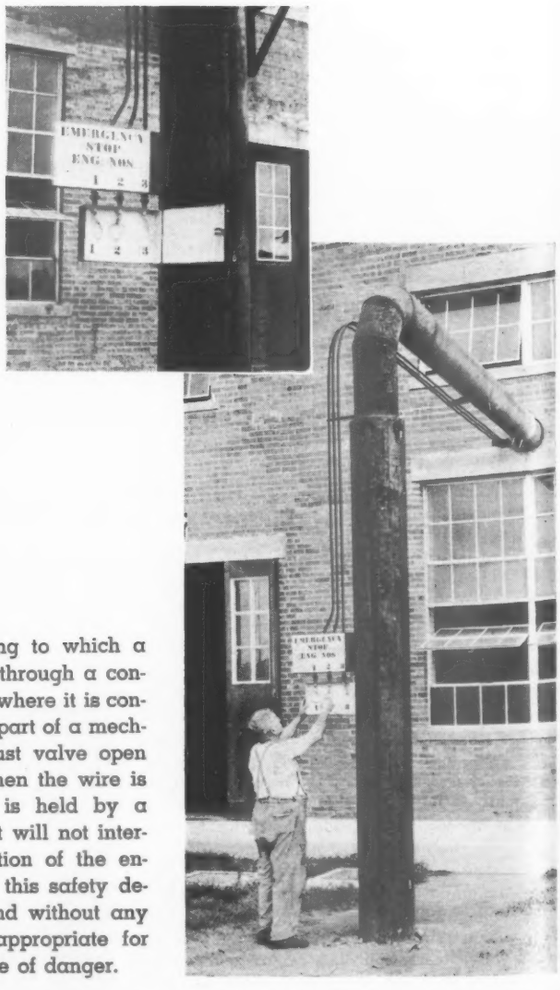
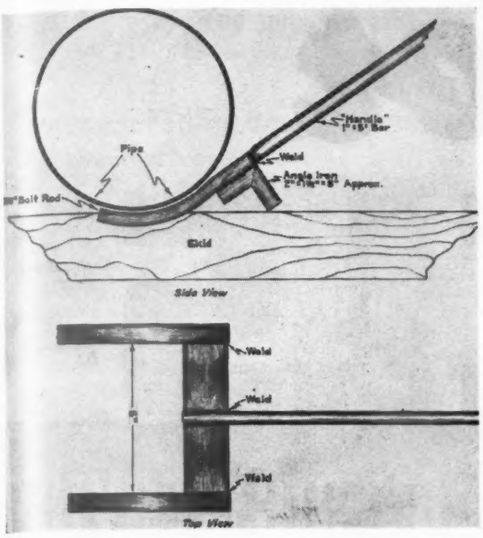




Emergency Shutdown Device For Diesel Engine

A main-line station of an oil pipe line has been equipped with shutdown devices which make it possible to stop each of the engines at a safe distance from the station. Emergency stops for "Engines Nos. 1, 2, 3" are grouped together at one point. Stops for each of the other engines are placed separately at points outside the building which are opposite the engine. Stopping an engine is accomplished by pulling a ring to which a wire is attached which runs through a conduit to the top of the engine where it is connected with a lever which is part of a mechanism for holding the exhaust valve open when the wire is pulled. When the wire is not pulled the mechanism is held by a spring in a position where it will not interfere with the normal operation of the engine. Since the operation of this safety device is done entirely by hand without any electrical equipment, it is appropriate for conditions which exist in time of danger.



ly than two. A welder can make the device in about 30 minutes. It may be observed in the photograph and drawing that this consists of a crow bar 5 ft. long and 1 in. in diameter, to which is welded a piece of ½-in. angle iron, approximately 2 by 1½ in. and 8 in. long, which serves as a fulcrum. To the ends of this angle iron are welded two prongs curved to fit snugly under the pipe which together form a fork on which the pipe rests. The two prongs must be wide enough to clear the skid sufficiently to facilitate easy handling of the device. It has been found to be very satisfactory on construction jobs where it has been used.

Device for Lining Up Joints of Pipe

A lever has been made by pipe-line welders which is especially adapted for lining up joints in connection with the stovepipe method of construction. It has been used this year in the course of laying several hundred miles of line. On most stovepipe jobs it is generally the practice to use two bar men for raising the back joints. With a device of the type shown here, one man can do the work more easily and effective-

Drag Towed by Ditcher

In laying large-diameter pipe by the solid welded construction method without the use of couplings, it is important that the bottom of the ditch be flat in order to provide for slack in the line when it is laid. To accomplish this a drag is towed behind the ditching machine, leveling the ditch bottom.

Extension Handle Used at Compressor Station

At a compressor station of one of the major natural-gas pipe-line systems, engineers have found that work of overhauling compressor units is assisted materially by a type of extension handle which has been devised especially for their requirements. This is made of sheet metal pressed into the shape of a hollow tube. One end is made so as to fit one type of wrench commonly used on compressor units while the other end is adapted for holding another wrench of a different type.

Contractor Uses Trailers

A pipe-line contractor uses a trailer for a field office established in towns near construction work. Close by the office trailer, two other trailers of a larger type are parked which provide warehouse facilities. The blacksmith's forge for repairing the contractor's equipment is set up under the awning between the two warehouse trailers.

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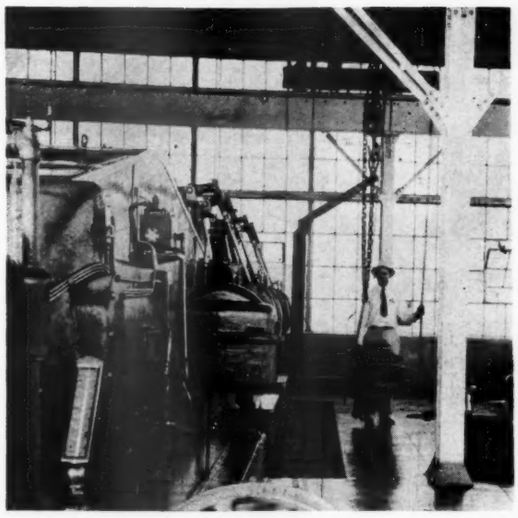
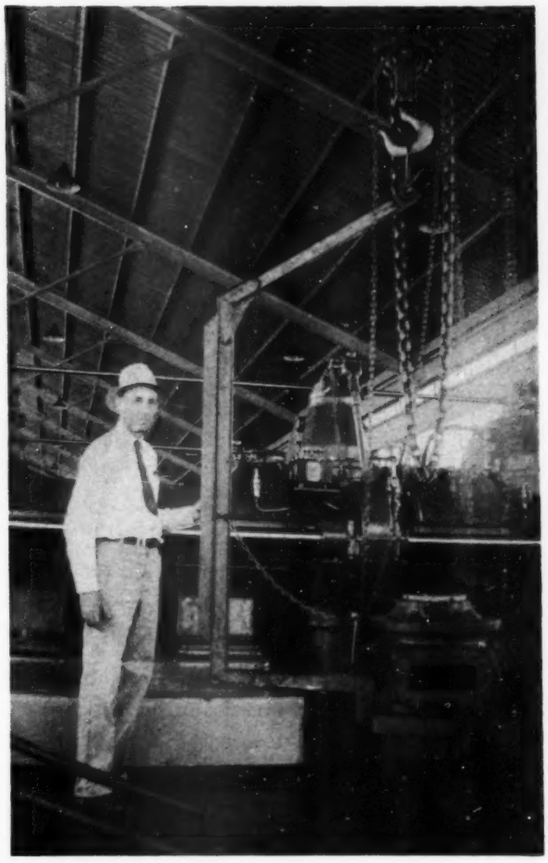
RIVER PLATE HOUSE
11 FINSBURY CIRCUS, LONDON, E.C.2
LIMITED LIABILITY
•
PLOIESTI, ROUMANIA
•
BARACAIBO, VENEZUELA

Practical Suggestions

Device for Removing Exhaust Valves

A gooseneck has proved to be useful at a compressor station. By using this in connection with the overhead crane, it is possible to remove exhaust valves in half the time and with much less effort than is required by the usual methods. The type of gooseneck shown in these illustrations is reinforced by an extra steel bar along the long vertical member, which adds rigidity particularly at a bend in the frame that is put under the greatest strain. A chain from the center of the vertical member to the exhaust valve prevents the exhaust valve from slipping off the large fork, at the lower part of the gooseneck, on which the exhaust valve rests when it is being moved.





Work Card Aids in Maintaining Diesel Engines

FORM 85, 1-39 MACHINERY WORK CARD

STATION _____ UNIT NO. _____

DATE	WORK TO BE DONE

At a point on the wall of the engine room, a major pipe-line company places a specially designed brass frame which holds a work card which provides means for recording miscellaneous observations regarding the engine. These observations are regularly made by engineers on duty at the station; notations are made also by company officials while making inspections of equipment. Repair work which needs to be done is recorded in a convenient way which makes it possible to attend to a number of small but important details when the engine is shut down.

Scraper Traps Outside Gate House

A major crude-oil pipe line has installed scraper traps with openings outside a gate house which is located between two trunk-line stations. With scraper traps of this kind it is possible to remove the scraper from the line, out in the open where the muck coming with it may be handled and disposed of more conveniently than it can be when the scraper trap is located in the pit inside the house. The line running from the scraper trap through the wall of the gate house connects with the manifold inside the building and acts as a relief line to permit the scraper to move into the trap. The equipment seen behind the line walker is a portable calibrating tank for testing the accuracy of meters used for measuring oil passing through the line.

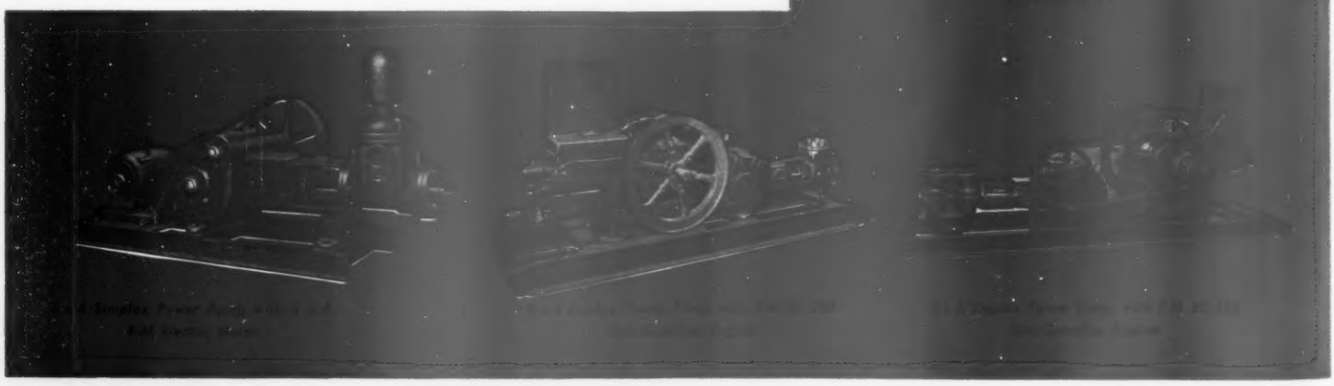
FAIRBANKS MORSE

NEW LINE OF POWER PUMPS

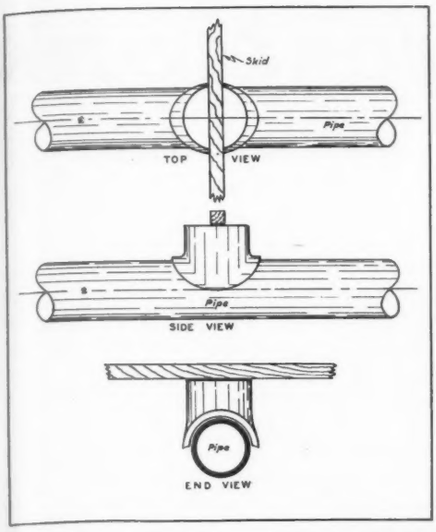
DETAILS OF CONSTRUCTION

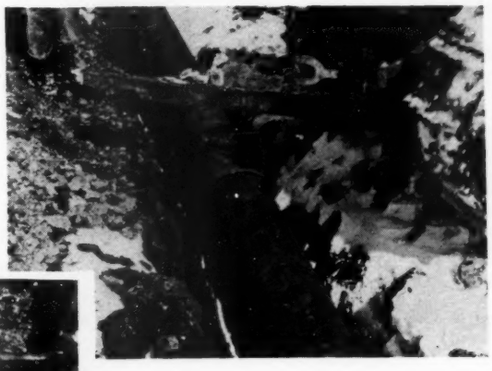
Many features of mechanical excellence, the result of much research and experimental work, are included in these New Fairbanks-Morse Power Pumps. • Frames are rugged one-piece castings, excepting 12" Pump, which has an all-welded steel power end. • All working parts are enclosed but readily accessible through removable dust-tight covers. • Heavy duty roller bearings on crankshaft and pinion shaft are sealed from crankcase oil and afford reduced friction and increased smoothness of operation. • A splash lubrication system uniformly lubricates all moving parts.

F-M Power Pumps are quickly and economically adaptable for almost any oil country fluids. • Removable bronze, cast-iron or steel liners are furnished as desired. • Valves can be supplied in bronze, stainless steel, cast-iron, bakelite or rubber. • All these features, plus many others, provide a well-designed pump — a pump that offers more in lasting service.



Practical Suggestions





Saddle Used in Bending Pipe

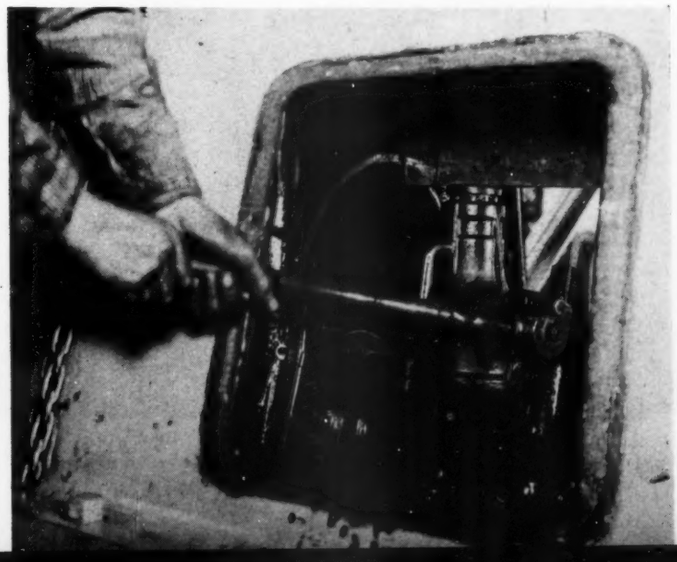
In the course of construction work carried on during the past winter, it was found to be advantageous to protect the top of the pipe by a saddle with an extension which would be high enough so that a skid could be laid across it at the desired height before the tractor was placed on skid for the operation of making a bend in pipe in the usual manner.

Loaded Line Welding Machine

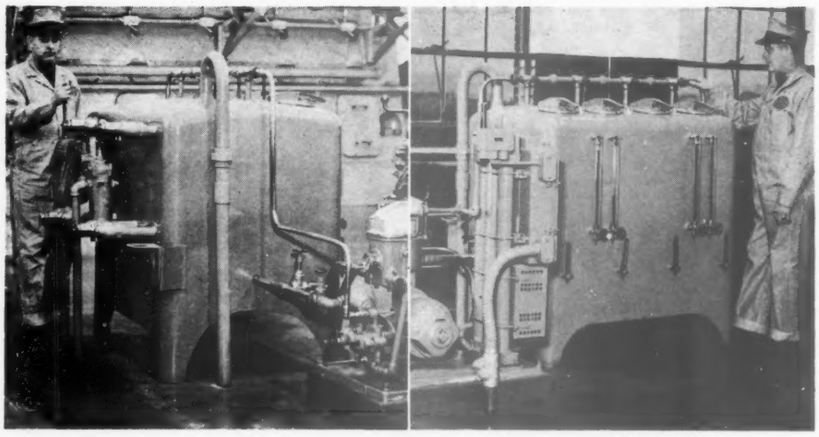
A compact trailer has been designed and built for a gasoline pipe-line system, primarily for the purpose of reconditioning corroded pipe. This is built as a complete unit with all equipment required for the work of repairing loaded lines. In addition to the electric welding machine, the unit is fully equipped with oxygen and acetylene for cutting operations; it has boxes for welding rods; it is equipped with electric brakes. Total weight of this unit is 2,250 lb.

Removing Engine-Cylinder Liners

When cylinders are replaced in close-coupled engines, short mechanical jacks provide an easy method for pushing out the old cylinder liners preparatory to installing the new ones. The jacks are placed in the center of webs of the crankshaft. During the first part of the operation, a block of wood longer than the diameter of the cylinder may be used effectively before it becomes necessary to use a shorter block at later stages. In removing a cylinder liner by this method, it is important that an even pressure be exerted by both jacks in order that the liner may move steadily without binding in the cylinder.



Practical Suggestions

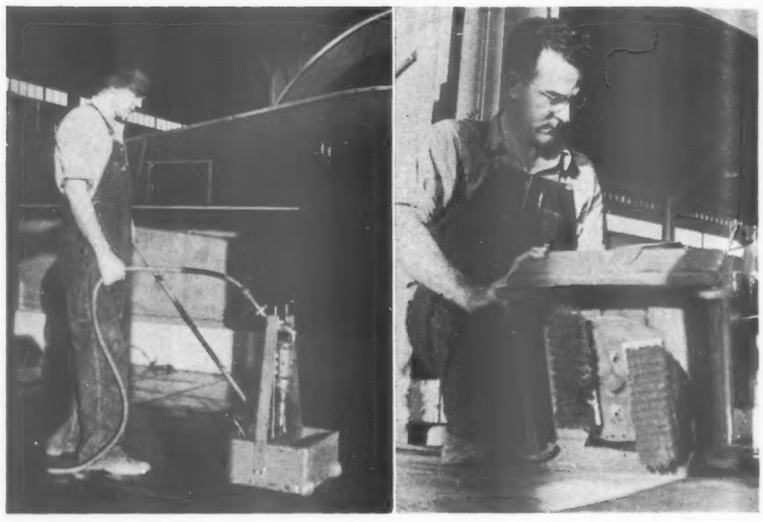


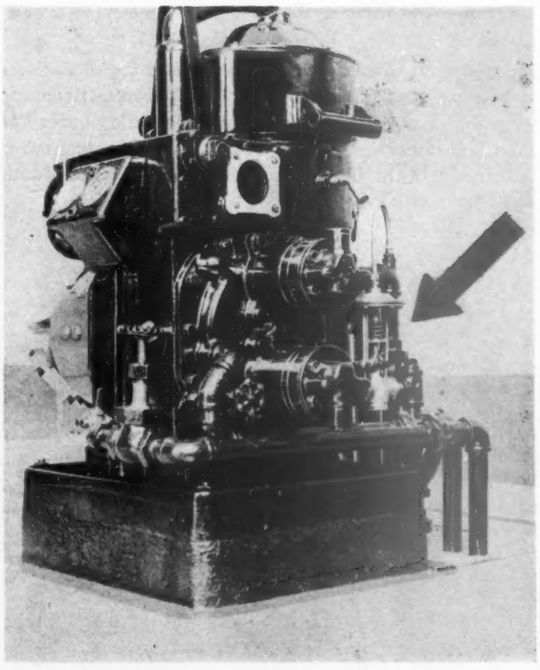
Engine Lubricating-Oil Tank

A major pipe-line system which operates lubricating-oil centrifuges to purify crankcase oil of diesel engines, has designed and built tanks of a special type which have proved to be well adapted for the requirements of station operation. The tank has four compartments. At the side a filter is connected by a manifold with the compartments of the tank. Connection between the centrifuge and the tank is made by top and bottom manifolding which provide for operating the centrifuge either by the continuous bypass or batch method. It is possible to arrange readily for selective switching of compartments in service. By constructing the tank so that the bottom is elevated from the floor and supported by cut-away sections, it is easier to reach under the tank.

Automatic Diaphragm Valve For Fuel-Oil Centrifuge

Before this control valve was installed it was often necessary to centrifuge more oil than is required for the engines, at a main-line pump station of a major crude-oil pipe line, consequently this excess oil overflowed from the fuel-oil day tank into the fuel-supply line leading to the centrifuge where it was recentrifuged. There is a float-controlled valve on the supply line leading to the fuel day tank. As the tank fills, this float valve is throttled and builds up a pressure in the supply line, this pressure operates against the diaphragm of the control valve, throttling the oil inlet to the centrifuge. The result is that only the correct amount of oil is centrifuged regardless of the number of engines in operation. This makes it possible to avoid heating more fuel oil than is needed to supply the immediate requirements of station operation.



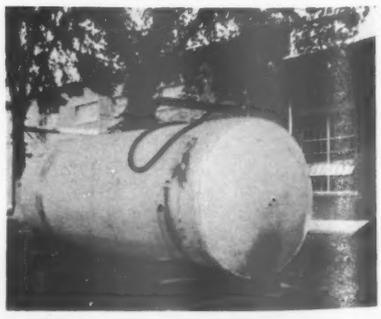


Air Drill Utilized for Polishing Device

For the purpose of furnishing equipment which could be made economically and operated effectively, a station engineer of a natural-gas transmission system originated the idea of using a ⅜-in. air drill to operate a polishing machine for the waxed floors of the station. Polishing is done by two ordinary scrub brushes which are attached to a disk which is turned by the air drill at 750 r.p.m. Since the polishing of waxed floors is an important part of routine maintenance operations, this device is in constant use. Because it is operated pneumatically it is safe to use anywhere in the station.

Air Tank Installed Outside Pumping Station

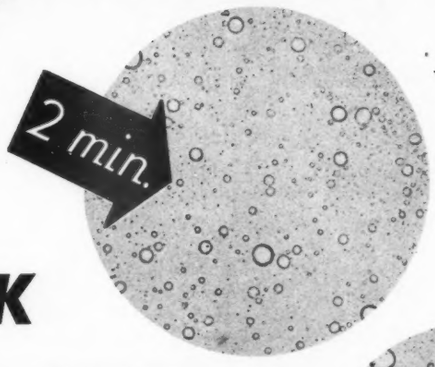
At a main-line pumping station, an air tank has been removed from where it was located inside one of the station buildings and has been installed at a sufficient distance from the building to substantially reduce the possibility of serious damage in case the tank should explode. In installations of this kind the practice prescribed is to use a concrete foundation in preference to steel.

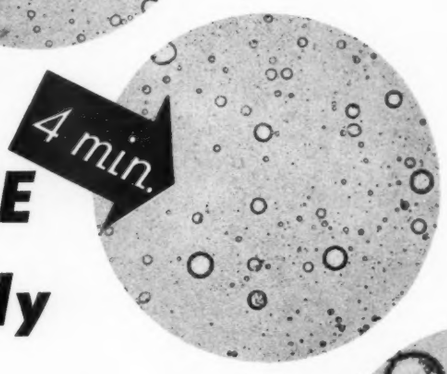


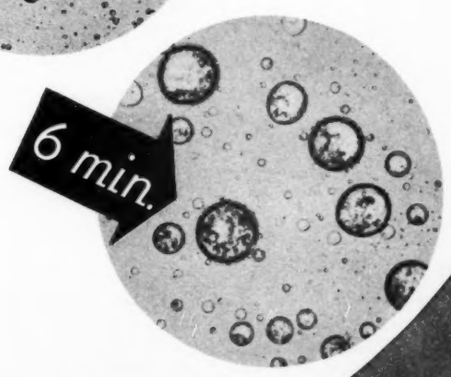
VISCO

EMULSION BREAKER

IS FAST!







LOOK THRU OUR MICROSCOPE at the speedy action of VISCO on an Oil Field Emulsion!

• Photographs show magnification of 110 times original size. •

• ASK ABOUT THE VISCO METHOD OF DESALTING REFINERY CRUDES. IT IS SUCCESSFUL AND PROFITABLE. •

NOTICE: Visco Products Company is authorized to manufacture and sell Visco Oil Treating Compounds for use in the breaking and resolving of oil emulsions under the following United States patents:

1,860,562	1,912,330	2,050,639	Re. 20,717
1,860,563	1,937,259	2,050,640	and patents pending.

Any purchaser of Visco oil treating compounds is authorized to use the same in the treating, breaking and resolving of oil emulsions in accordance with the above patents. Visco Products Company is authorized to and is willing to grant licenses to oil companies under any and all of the above patents on royalty bases, permitting the producer to purchase the oil treating compounds at will from any vendor, and to prepare the compounds for use under the above patent or patents. Application for license should be made to VISCO PRODUCTS COMPANY, Houston Texas.

VISCO PRODUCTS COMPANY, *INCORPORATED* **· HOUSTON, TEXAS**

WHY PIPE LINE M

Fig. 2652. 12" stroke — 176 bbls. at 1500 lbs. to 592 bbls. at 500 lbs.

Fig. 1741, with Diesel Drive— 250 bbls. at 600 lbs. to 502 bbls. at 300 lbs.

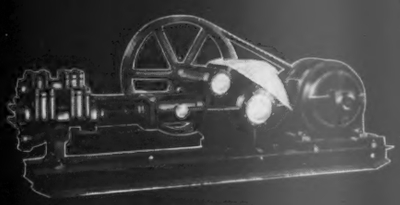


Fig. 1742. Electric Motor Drive. 54 bbls. at 1400 lbs. to 250 bbls. at 600 lbs.

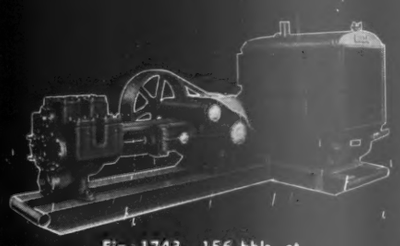
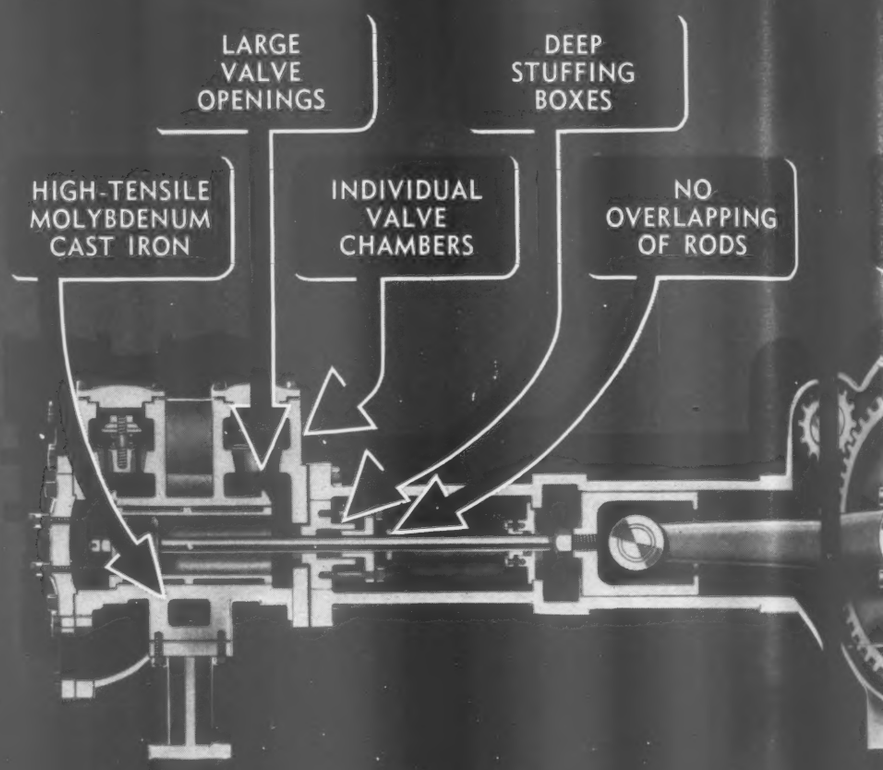


Fig. 1743. 156 bbls. at 925 lbs. to 578 bbls. at 260 lbs.

Fig. 201. GASO Rodline Pump. 30.96 bbls. at 18 strokes, to 41.28 bbls. at 24 strokes.



THE dominating position of GASO Pumps in the field of oil pipe line pumps is not due to luck or to aggressive salesmanship. It is due to merit of product, achieved through a quarter century of strict specialization. GASO Pumps are built exclusively for oil pipe line use, and are designed by engineers of long experience to deliver exceptional performance in this service. Some of the features which have made them the choice of pipe line engineers, are here listed:

High-Tensile-Strength Molybdenum Cast Iron is used for fluid-end casting.

Extra-Large Valve Openings and Fluid Passages permit proper filling at highest speeds.

Individual Valve Chambers.

Extra-Deep Stuffing Boxes give tightness without undue tension.

Long Frames Prevent Overlapping of Piston Rods. Pumped fluids will not reach crankcase.

Herringbone Gears are Center-Mounted on Shafts to equalize loads on bearings.

GASO

E MEN PICK GASO

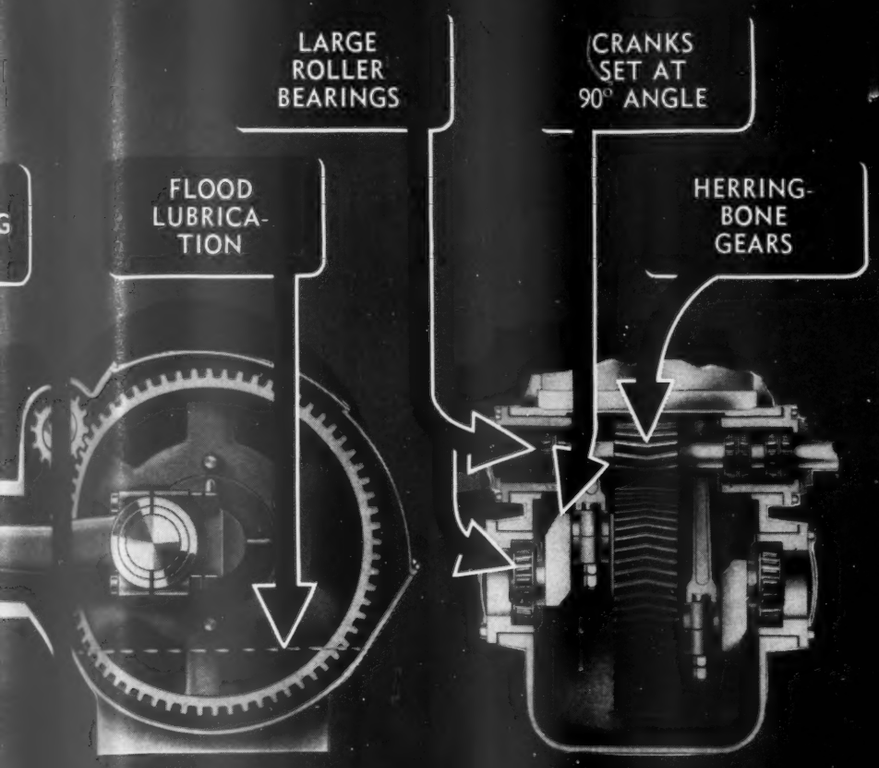


Fig. 2050-S. Portable Unit. 59 bbls. at 1000 lbs. to 255 bbls. at 250 lbs.

Fig. 2249. Also mounted on trailer. 46 bbls. at 750 lbs. to 126 bbls. at 300 lbs.

Fig. 1550. 59 bbls. at 1000 lbs. to 255 bbls. at 300 lbs.

Extra-Large Roller Bearings mount crank, pinion and worm shafts, each operating in separate removable housing sealed off from crankcase oil.

Cranks Set at 90-Degree Angle give overlapping piston stroke assuring smooth flow.

Flood-Lubricated gears, crosshead and connecting-rod bearings, by oil bath in enclosed crankcase.

Uniform Wear on Ring Gears, assured by worms of hardened alloy steel, ring gears of bronze.

Versatility. Interchangeable liners: pistons, rings and piston rods of any materials specified: valves of any type desired.

Replacement Parts that Fit.

Send for catalog, or refer to Gaso Section, Composite Catalog.

Gaso Pump & Burner Mfg. Company, Tulsa, Okla. Export Office: 149 Broadway, New York. Houston: 2108 Tangley. Los Angeles: Service Oil Field Supply Co., 5333 S. Riverside Drive.

Fig. 1849. 46 bbls. at 900 lbs. to 126 bbls. at 350 lbs.

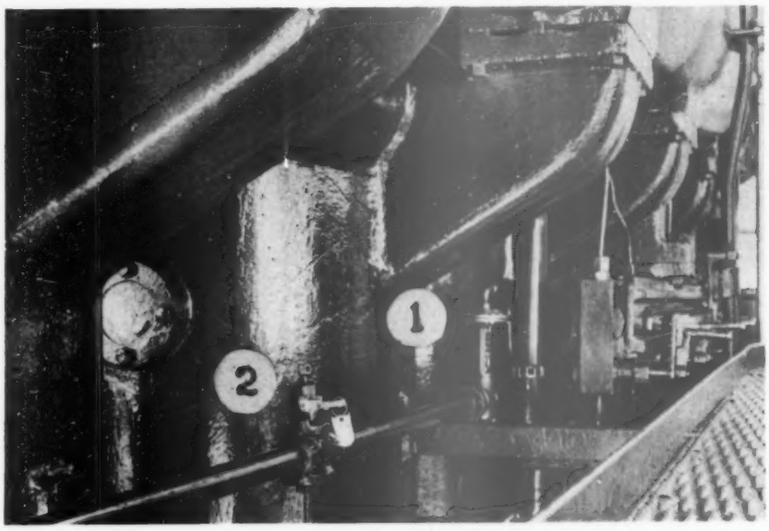
Fig. 301. Piston Power Pump. 24 to 30-inch stroke. 31.73 to 157.36 bbls. per hour.

PUMPS

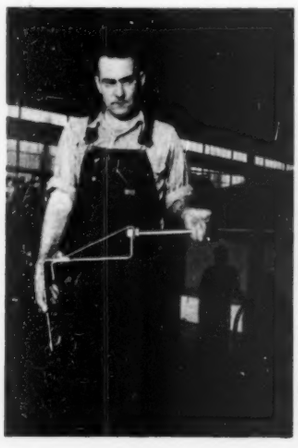
Practical Suggestions

Shutoff Valves on Fuel Line of Diesel Engine

To protect the bearings of diesel engines from damage due to failure of the lubricating-oil supply an automatic shutoff valve is installed in the fuel-supply line to the fuel pumps. This automatic valve (1) is of the diaphragm type. The valve is held open by the lubricating-oil pressure while the engine is in operation. A drop in the lubricating-oil pressure of a few pounds permits the



valve to close, shutting down the engine before damage can occur to bearings. To eliminate explosions in the air-piping systems of air-injection diesel engines, resulting from fuel oil gravitating through the fuel pumps and check valves into the air systems while the engines are shut down, a small lubricated plug valve (2) has been installed in the fuel-supply line leading to the fuel pumps. In place of shutting down the engines in the conventional manner by setting the fuel-pump control in stop position, the engine is shut down by closing this lubricated plug valve. This insures that the valve is closed at all times when an engine is out of service. Two points regarding this valve are kept clearly in mind by those on duty: (1) It is sealed when shut down; (2) seal is not broken until engine is ready to start.



Speed Gate Closer for Compressors

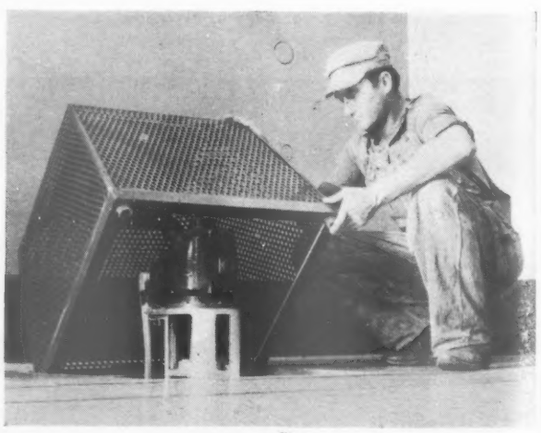
What is known as a "speed gate closer" has been made by an engineer at a compressor station. This makes it possible to open and close valves quickly and conveniently. The device is made principally of ¼-in sheet steel, 2½ in. wide. The handle is a ¾-in. brass rod 10 in. long attached to the rest of the device by ⅝-in. bolt. A reinforcing member held by bolts and reinforced by a welder adds rigidity to the device. When in use, it is hooked on the spoke of a valve wheel and swung around over the rim.

Form for Pouring Concrete Around Pipe

In Oil Creek, near its confluence with the Allegheny River, near Oil City, Pa., a form made of sheet steel is placed around a 4-in. natural-gas pipe line preparatory to pouring concrete to furnish a coating to protect against corrosion. The form is supported by wire cable suspended from joints of pipe resting on piles of rock. By this means, the form is held above the level of the water during the operation of coating the pipe with concrete. After the coating operation is completed the pipe is lower into the trench in the bed of the stream.

Shield for Sump Pump

A serviceable safety shield for a sump pump has been constructed which provides for the passage of air necessary for ventilation; the pump may be easily inspected at all times. At the same time the shield is strong and light. It is made of sheet steel with large perforations with a substantial frame made with welded construction. Shields of this type are made in the company's shop.



Oxyacetylene Welding and Cutting in Re-Laying Pipe

Special techniques developed in regular work—bevel cutting, double lengthening, multi-flame welding, make salvage and reuse of pipe profitable

(Prepared by engineers of Linde Air Products Co.)

Fig. 1—(Above): After the obsolete or defective pipe line has been removed from the ground and cleaned, usually in a "rattler," the badly pitted or corroded sections are cut out or repaired by building up with welding rod. Pipe edges are then quickly prepared for welding by bevel cutting with a hand blowpipe, as shown.

Fig. 2—(Right): Special lengths of pipe can be cut and the edges beveled in preparation for welding by means of the pipe-cutting machine, which is readily portable and is adjustable for 8, 10, and 12-in. standard line pipe. Pipe cutting by machine is particularly useful for the fabrication of special piping equipment, such as this section of a special bull-plug fitting.

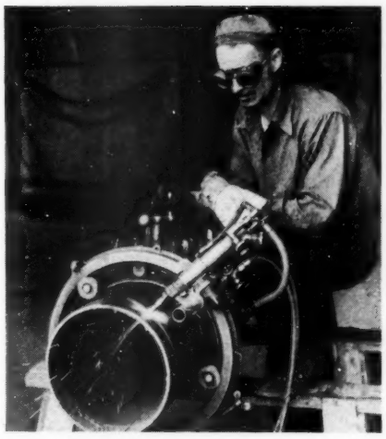


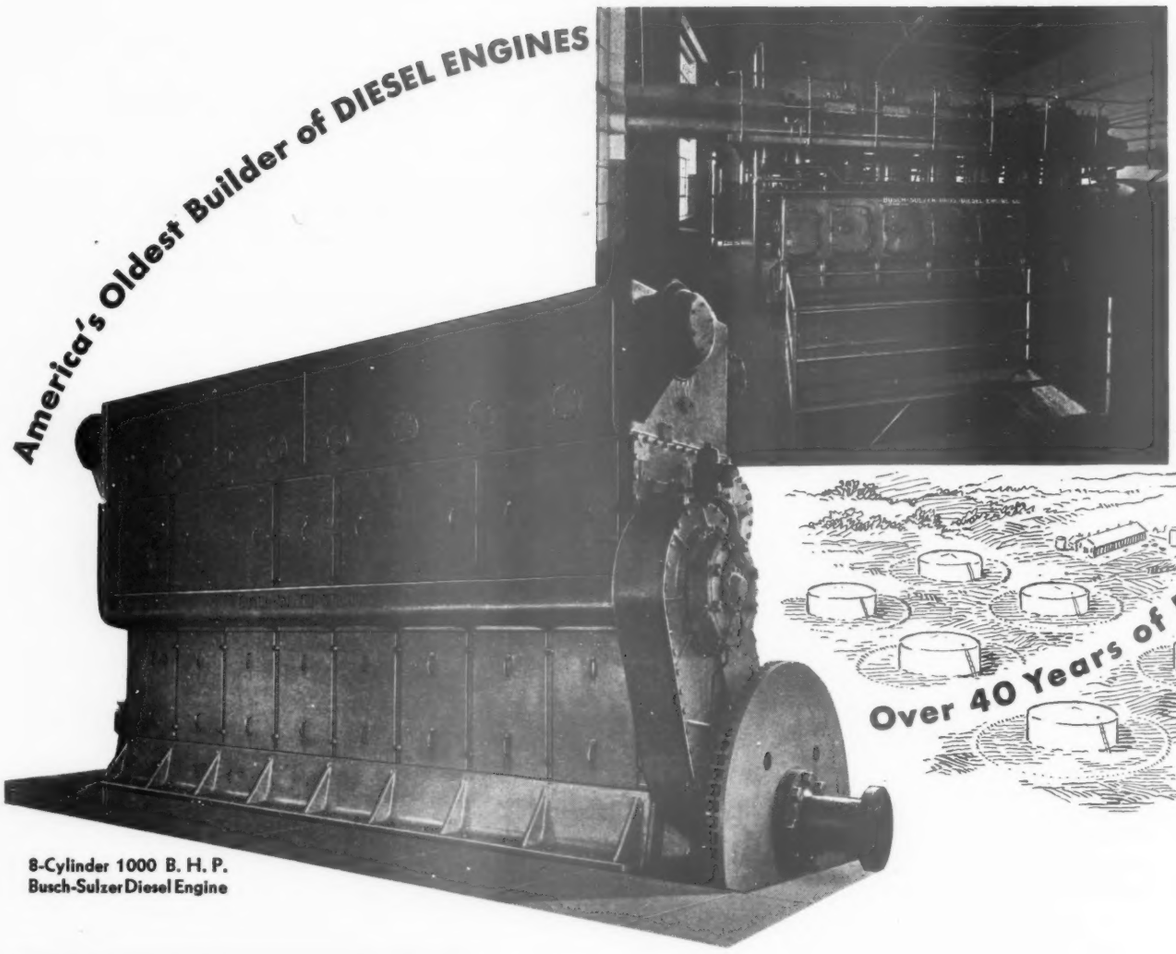
Fig. 3—(Above): The cleaned and beveled pipe sections are then racked up and double-lengthed by operators, working in relays. Here short sections of 16-in. diameter steel pipe have been first positioned and tack-welded to form lengths of about 40 ft. The operators are making rolling welds by the Lindeweld method. A six-flame welding tip, specially designed for making rolling welds by this back-hand method, and a low-alloy, high-strength steel rod are used. This welding method permits an increase of about 25 per cent in gas consumption.

Fig. 4—(Below): The double-lengthed pipes are strung out along the right-of-way where they are positioned by the line-up gang and tack-welded together, as shown here. As soon as three joints have been tack-welded, this operator moves further down the line to repeat this operation and his place is taken by the firing-line welding operators.

Fig. 5—(Circle): Three welding operators work simultaneously making the welds in position. They start at the top of the joint and proceed continuously around to the lowest point, then start again at the top and proceed down the remaining half of the weld.

Fig. 6—(Right): Uneven terrain over which the pipe must travel or bends in the direction of pipe present no problem if wrinkle bending is used. Large-capacity welding blowpipes are used to heat a section of the pipe circumference. The pipe is then pulled by block and tackle to form a wrinkle.

America's Oldest Builder of DIESEL ENGINES



600 B. H. P. Busch-Sulzer Diesel Engine —Driving Pipe Line Pump

Over 40 Years of Experience

8-Cylinder 1000 B. H. P. Busch-Sulzer Diesel Engine

Pipe Line Companies Now Using Busch-Sulzer Diesel Engines:

CENTRAL STATES PIPE LINE CO.
GREAT LAKES PIPE LINE CO.
GULF REFINING CO.
HUMBLE PIPE LINE CO.
MAGNOLIA PIPE LINE CO.
OKLAHOMA PIPE LINE CO.
SINCLAIR PRAIRIE PIPE LINE CO.
SINCLAIR TEXAS PIPE LINE CO.
STANOLIND PIPE LINE CO.
TEXAS EMPIRE PIPE LINE CO.
TEXAS NEW MEXICO PIPE LINE CO.
TIDEWATER PIPE CO.

Before You Put an Engine on the Line, Get a Line on This Engine

Maybe there's little need to tell you about this engine that is built by America's oldest builder in the Diesel field . . . an engine that represents a great deal more than an engineer's blueprint—a worker's skill.

Perhaps you yourself can go back fifteen, twenty or more years when Busch-Sulzer's experience was only half that which it is today—can talk about this Busch-Sulzer Diesel and that... pipe line engines that were operating with the utmost efficiency then . . . the very same engines that are still giving top-notch performance today.

Another big advantage is always yours — the fact that you are located within quick service distance of the large modern Busch-Sulzer Works in St. Louis. Orders for parts are handled in minimum time. Maintenance costs remain low.

Of the large number of Busch-Sulzer engines now operating along the pipe lines, 82 already have given fifteen or more years of dependable service.

BUSCH-SULZER BROS.-DIESEL ENGINE COMPANY
Over 40 Years of Experience

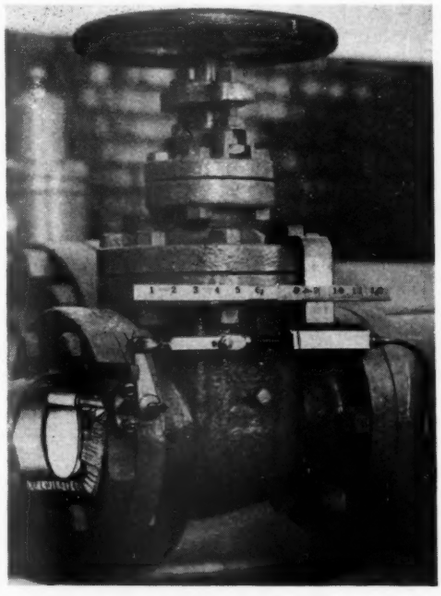
BUSCH-SULZER
ST. LOUIS

More POWER to You . . . . at less cost!

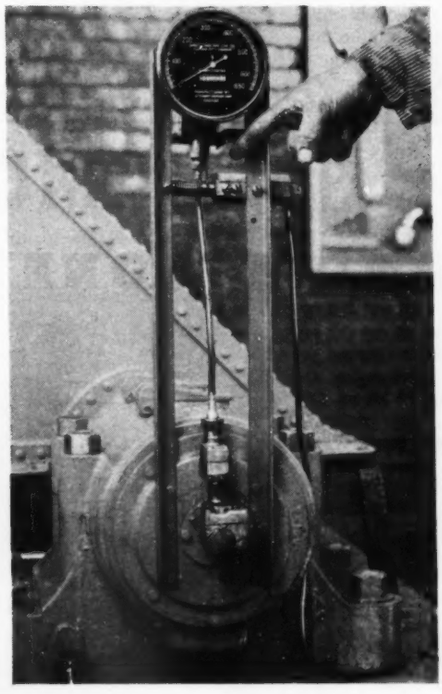
Integrating Tachometers Show Reciprocating Pump Flow

MANY pipe-line companies operating reciprocating-type pumps powered with variable-speed diesel engines have used the over-and-short method for dispatching products; in other words, the initial pumping station of a section of line would discharge into a tank at the next downstream station and that station would relay the stream in a similar manner progressively through successive stations to its destination. This procedure was known as floating. Manual synchronization of the throughput capacity of lines common to pumping units was attempted at each station but the vagaries of the massive mechanical governors with which the engines were equipped caused speed droops that were responsible for variations of from 3 to 10 per cent in the pumping rates. It was therefore impossible to regulate the throughput capacity of successive stations to maintain a fixed flow rate in a section of line where more than two stations were involved. If any two stations pumped the same quantity it was an accidental coincidence but by checking the stock at each station hourly the dispatcher had a reasonable conception of the locale of all tenders in transit.

With the construction of finished-product pipe lines and the introduction of more exact refining processes, it was essential that segregated products be confined to the pipe line while in transit and contact tankage only at points of acceptance and delivery. The refiners desired less contamination of the various crudes and the marketers objected to contamination of the finished products. Gasoline pipe lines equipped with reciprocating pumps following established precedent used the conventional over-and-short method although, in many instances, a surge tank at each station was available for floating the stream and shipping tanks were allocated to each particular product. Even the surge tank, with its recognized advantages over the conventional storage tank, was not a panacea for the ever-lurking contamination problem and the slowing down of upstream stations to permit subsequent downstream stations to empty surge tanks whenever a product change was approaching resulted in a serious impairment of line capacity.

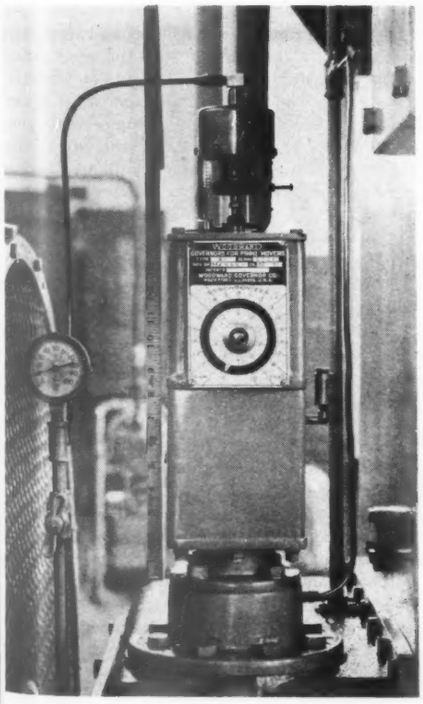


Tachometer flow-control mechanism. With the butterfly valve in the position shown flow through the bypass line is stopped and the hydraulic plunger has returned to the point that permits the tachometer clutch on the power end of the pump to engage



Integrating flow-rate tachometer. Indicates momentary flow rate in barrels per hour and totalizes barrels pumped in unit time. The hand is pointing to the declutching lever and hydraulically actuated plunger that engages the tachometer

Below: Closed pump circuit regulator. The incoming stream pressure, acting through the regulator, above the governor, adjusts the engine speed to maintain a constant positive suction pressure on the inlet side of the pipe-line pump. The small line connecting the regulator to the pipe-line suction is charged with Prestone to prevent corrosion of the regulator bellows



It was conceded that this method of operation possessed many objectionable features and a decision was reached whereby hydraulic relay-type governors were installed on all engines. A pressure regulator was mounted directly above the speed-changer spring of the governor and it was connected by a small line to the incoming stream. The use of tankage at intermediate pumping points was discontinued and each station, following a progressive sequence, discharged into the pump suction of the next downstream station. The incoming stream pressure acting through the regulator was used to accurately position the speed-changer spring and adjust the speed of the engine to satisfy shifting flow rates. Suitable relief valves were provided to relieve the stream to emergency tankage in the event of engine failure. The new method of operation eliminated the possibility of contamination, lessened evaporation and simplified dispatching. It then became necessary for the dispatcher to merely check the tank gage at the initial pumping station against the gage of the receiving tank which might be from 100 to 400 miles away with from two to eight intermediate stations. Any shortage would be indicated hourly unless it was occasioned by a line break in which event the intermediate stations immediately downstream from the break would note a slowing down of its engines and a consequent decrease in throughput. Tank-gate or relief-valve leakage, unless of sizable proportion, would be indicated when the midnight stock gages were taken and the stock balanced.

It was decided to investigate the possibility of measuring the flow at each station by pump displacement using a revolution counter and a conversion factor. It was known that with minuscule variation the volumetric efficiency of the pump remained constant through a wide pressure and speed range so long as a positive head was maintained on the suction side: consequently, to assure positive suction-head operation and subsequent constancy of the pump's output for all speed ranges it was imperative that a closed pumping circuit be part of the scheme.

A conception of the accuracy of throughput

(Continued on Page 165)

Safety Practices in Testing High-Pressure Gas Lines

(Continued from Page 86)

Gage lines are run to a safe distance to the windward side of the gate valves or other pressure points where the gage reader sets up his portable phone. It should be mentioned here that should the wind change direction while test is in progress, the raising of pressure is discontinued until all gage lines and telephone connections affected are moved to the opposite side of pipe line.

The right-of-way is covered the day before test and all those living close to it or working near are advised to stay at least 500 ft. off the line during test. If farm houses are too near right-of-way, the occupants are requested to extinguish all fire and leave the house during test.

The right-of-way of each section is again gone over immediately before the test is started to see that all is clear and any requests made have been complied with. This second coverage of the right-of-way is made by the men in the test crew when they go to their assigned places. During this coverage livestock is driven to a safe distance from the line, and clearance reports are made to the supervisor by telephone as soon as men reach their posts.

Let it be assumed that the test is on a single line between two compressor stations and the first section to be tested is between the station and line gate No. 1. The men at gate No. 1 close the main-line gate but leave bypass slightly open, just enough to let some gas pass but not enough to prevent the pressure from equalizing within a fraction of a pound in the section when test is started. This can be regulated after starting to pump gas and before any critical pressure is reached.

Men are also placed at line gate No. 2, the first gate downstream from section being tested. This gate is closed and bypass opened. This is necessary in order to make a quick shutoff in case trouble occurs close to or at No. 1 gate, in which case the line would have to be blocked at gate No. 2.

All men having reported in from their assigned posts, and everything being in order, the engineer in charge of the compressor station is given the order to start raising pressure. Pressure can be raised reasonably fast up to the maximum pressure at which the line has been operated. When that point is reached, the guards at highways and road crossings are instructed to stop traffic from crossing line. Pressure is then raised at the rate of 1 to 1½ lb. per minute until within a few pounds of the test pressure desired. At this point the rate is reduced, if necessary, in order that the maximum pressure required is reached simultaneously at both ends of section. Previous calculations should be made, taking into consideration the difference in elevation of the gate valves, to determine the correct test pressure at each gate. If this is done, there will be no danger of exceeding the pressure at which a section has already been tested when testing sections ahead that may be on considerably higher ground.

Pressures are reported to the supervisor of test every 5 minutes from compressor station, gate valves and other pressure points. If care is taken in bringing the pressure up, it will be found that all pressure points reach the desired test pressure at approximately the same time. The small amount of gas going through the bypass at gate No. 1 will take care of any small amount of surge in the line when top pressure is reached at the compressor station. Station is then shut down and after a 10-minute wait, line walkers are started.

In the meantime, the rest of the crew moves ahead one gate valve and prepare to test section between gates No. 1 and No. 2. The bypass at gate No. 2 is closed (main-line gate having previously been closed), and bypass at No. 1 gate is opened, allowing gas in sections between station and No. 2 gate to equalize. Then No. 1 gate is opened one-third and bypass closed. Main-line gate No. 3 is closed and bypass opened. When all guards have reported ready, the same procedure is followed as when testing the preceding section. This routine is followed each time a section is tested except that, beginning with the third section, and each section thereafter, men are stationed at the gate valve on the upstream side of the section next to the section under test. In other words, if testing between gates No. 2 and No. 3, men are left at gate No. 1. This gate is left only one-third open until test is completed between No. 2 and No. 3, after which it is opened wide.

At all times men walking the pressured section of line are not allowed closer than 300 ft. to the line. Walking the line at this time is only for the purpose of finding split center rings or other similar failures, and not to locate small leaks.

The matter of making repairs when blowouts occur will not be gone into here. Suffice it to say that with men located as outlined, they can reach the point of trouble in the shortest possible time and having all necessary equipment ready and on the job, rapid repair of the meanest kind of job can be made.

Careful planning of each test with safety uppermost in mind and the successful completion of the test work, make for confidence in subsequent system operations. Emergency consideration of each repair occasioned by the test, whether or not the line is immediately essential to operations, increases efficiency of maintenance crews in any future emergency work and enables them to carry out repairs rapidly and safely.

A SLICK JOB
AND A MONEY-SAVER, TOO

There are no detours on the road to lower line pipe costs when you follow a "selective buying" program with ARMCO Spiral Welded Pipe. During the past ten years many an oil man has found this an easy way to make really worth while savings. This is the short and simple story.

ARMCO Pipe is available in diameters from 6 to 36 inches with wall thicknesses from 7/64 to ½-inch. From this wide range you merely select the gage of pipe in any diameter that best fits your job. Never again need you pay for excess weight.

"Selective buying" is a great help to pipe crews too. You can use ARMCO Pipe in lengths up to 50 feet as conditions permit. Longer lengths naturally mean fewer sections to handle and fewer joints to weld. Many contractors say ARMCO Pipe field welds faster and easier than other types.

Whether you need a few hundred feet or several miles of ARMCO Pipe remember prompt delivery is the rule. Try "selective buying" on your next gas gathering job and watch ARMCO Spiral Welded Pipe save you money. Write for prices and additional information. The American Rolling Mill Company, Pipe Sales Division, 2391 Curtis Street, Middletown, O.; 501 Mayo Building, Tulsa, Oklahoma; 3500 Maury St., Houston, Texas.

ARMCO

ARMCO SPIRAL WELDED PIPE
LINE PIPE AND CASING

Keep Engines Running

at Maximum Output—with Minimum Trouble

American Industry faces the most crucial test in years. Production facilities will be strained to the utmost as governmental and civilian orders pile up. Production equipment must be at peak efficiency.
Be sure all internal combustion engines, compressors and pumps are equipped for maximum output, minimum maintenance. Equip each one NOW with Protectomotor Intake Filters. Stop trouble where it frequently starts—in abrasive dust that wears reciprocating parts and clogs valves, reducing production as it increases chances for trouble. Be ready, America—equip with Protectomotors NOW!

MODEL DS SILENCES, FILTERS AIR TO ENGINE INTAKE

You wouldn't permit this . . . or this . . .

WHY LET UNPROTECTED ENGINE INTAKES DRAW IN DUST - - CAUSE EXCESSIVE NOISE?

The Model DS Protectomotor is the only device that not only prevents the intake of dust to air-breathing machines, but also silences the intake sound. It provides constant efficiency throughout operating period and less restriction than any other air filter.
Construction is simple, rugged and effective, possessing many exclusive, patented features and special advantages.

A. Series of cylindrical rectifying chambers of scientific diameter to length ratio which smoothes out sound waves.
B. Dry Feltex Filtering Medium 99.8% efficient by University of California Laboratory tests.
C. Radial Fin Construction. Permits large area of filtering medium to occupy smallest possible space.
D. Rigid, galvanized mesh frame.
E. Reinforcing tube. The Model DS Protectomotor is "built like a battleship."

MODEL D INTAKE FILTER (Left) extensively used on intake of engines and compressors where noise elimination is not important. Same construction as Model DS except for silencing features.

WRITE FOR CATALOG describing filters for engines, pipe lines, ventilation, etc.

STAYNEW FILTER CORP.

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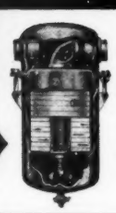
PROTECTOMOTOR 99.8 Per Cent EFFICIENT AIR FILTERS

NEW



SLIGHTEST TRACES OF OIL REMOVED FROM AIR TRANSMISSION LINES WITH LATEST PROTECTOMOTOR, MODEL AAPHS PIPE LINE FILTER. Staynew engineers have designed an entirely new type of pipe line filter, now used extensively for the protection of delicate air-powered control devices. This new filter, the Model AAPHS prevents passage of the most minute traces of vaporized oil. The AAPHS is actually a "super" filter, used in most applications as the final of two or more stages of filtration.
Construction Features: (1) inlet; (2) baffle; (3) Solid Feltex Discs through which all air must pass; (4) carrier tube; (5) outlet; (6) shell; (7) drain cock.

Study of Internal Corrosion in Horizonal Gas Engines

(Continued from Page 89)

sary to consider oxygen removal continuously before the water entered the engine-cooling system. The other alternative was to consider a closed system. Gasification was tried experimentally and it was found that desired results could be obtained toward eliminating corrosion by displacing oxygen with natural gas. The use of natural gas was practically employed to remove oxygen from the circulating water at that plant where the most severe corrosion had been suffered. Results to date have been satisfactory.

Further study into the mechanical factors involved disclosed a relationship between water hammer in the piston water system and the rod corrosion. It was assumed that water hammer caused high instantaneous water pressures during certain positions of the piston stroke. Indicator cards were taken at different points on the piston water system to determine just what pressure conditions prevailed. Cards were also secured under variable operating conditions, such as speeds, loadings, and inlet-water pressures. All of the diagrams proved that a wide variation in pressure existed over the cycle. When a heavy water knock occurred, the peak pressures ran as high as 300 to 400 lb. These pressures dropped abruptly from the peak to below atmospheric pressure and rose in lesser peaks and following depressions throughout the stroke. Such peak pressures always occurred when the air cushion was not maintained in the air chamber connected to the inlet piping. Such air cushions were not normally maintained without separate air injections under the higher operating speeds.

Even with the assumption that some of the peak pressures that were recorded might be exaggerated by indicator inertia, the cards substantiated the extreme violent and interrupted flow of water through the rods. The volume of water

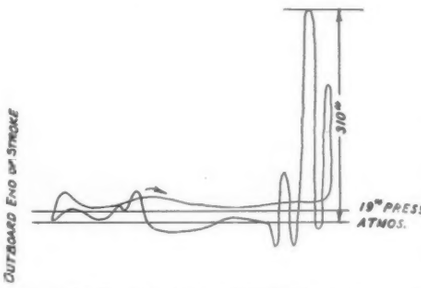


Fig. 3—Diagram showing pressure conditions prevailing in the piston water system

delivered to the rod under full loads and speeds of 125 r.p.m. is approximately 45 cu. in. per revolution. Water is discharged through the tailpiece on the inboard stroke of the pistons. However, water enters the rod through the telescopic tubes both on the inboard and part of the outboard stroke. The displacement of the telescopic tube in its working barrel accounts for some elevation in pressure. As the total length of the rods and pistons on one side of the engine is 26 ft. the bulk of water as held in the piston, together with the tortuous flow through the piston, tends to leave certain lengths of the rod free from water during certain positions in the stroke. The inertia of the water reciprocating back and forth meeting first obstructions in the water course at one position and the incoming water in other position creates the high-pressure waves. The depression below atmospheric tended to release oxygen with which the water was saturated. The release of such oxygen at points of turbulent flow and at points in the stroke where vacuum occurred no doubt tended to cause cavitation. The most obvious corrective measure was to maintain sufficient cushioning throughout the stroke to prevent the inertia effect or to keep the rod more nearly full of water throughout its length during all positions of the stroke. Air injection into the air chamber had the desired result if the air was injected in the proper location. Diagrams taken with such injection indicated even-pressure conditions and elimination of any point below atmospheric. Free-oxygen liberation might thus be prevented by sudden pressure drops. The use of air injection was put into practical application by piping air directly to the air chambers. From observation, this method has reduced corrosion so that many rods have not shown any additional deterioration. Those rods repaired by welding remain intact. Feeling that air injection alone might only partially solve the problem, comparative results are being obtained by using natural-gas injection to supply the cushioning effect rather than air.

As a further step toward maintaining as much of the rod and piston system full of water as possible, those pistons and rods used as replacements to those rods corroded beyond repair are designed to eliminate as much turbulent flow as possible. This is done by streamlining the water course, particularly in and out of the pistons to avoid abrupt right-angle turns. Another method of retaining the maximum amount of water in the rods is being tested. Spirals with sufficient pitch to allow free passage of water are inserted in the rod bore. Such rods are operating without water hammer. However, a slight vacuum is indicated if no air or gas is injected.

With the combination of the steps as outlined, together with further design changes under consideration, the mechanical aspects of the problem can no doubt be completely solved. The chemical factors apparently are successfully eliminated by the use of natural gas for complete oxygen removal.

Valves for pipe lines

Fig. 170 400-lb. Test | Fig. 187 700-lb. Test | Fig. 177 1000-lb. Test | Fig. 192 1600-lb. Test | Fig. 79 2500-lb. Test

A FULL range of sizes for low, moderate, high and extreme pressures are included in the large Kennedy line of valves for oil and gas industry services. Each type is specially designed for the particular requirements of the service for which it is intended, with a large factor of strength and with many special features of design that assure trouble-free service and long life.

Kennedy Valves can always be depended upon to close tightly, release promptly at the first turn of the valve wheel, and to open or close without sticking or binding whether operated frequently or at long intervals.

The Kennedy Valve Mfg. Co., Elmira, N. Y.

KENNEDY
Extra Value in VALVES

Recent Construction, Operating Improvements in O.N.G. System

By C. U. DANIELS
Vice President, Oklahoma Natural Gas Co.*

THE pipe-line facilities of the Oklahoma Natural Gas Co. extend over a large part of the State of Oklahoma. There are 150,210 customers served of which 135,778 are domestic and 14,432 are commercial, industrial, etc. In all, there are 97 cities and towns within the state which receive their gas supply from this company. The two principal cities in the state are Oklahoma City, with a population of 204,517, and Tulsa, with a population of 141,750, each being supplied with gas by this company through several transmission lines. Gas is transported through 1,949 miles of line and distributed through 1,933 miles of line, the pipe varying in size from 2-in. to 16-in. diameter. The changing character of markets and supply points requires that the transmission system be flexible in operation and that construction and retirement programs be kept up to date. Newly developed methods and equipment are constantly being perfected which result in economies and improvements in operating and construction methods. We feel it is important that this company keep abreast of these new practices in order that efficiency of gas service be kept at highest possible point.

Depletion of old gas fields, discovery of new fields, acquisition of new markets and increased use of gas bear heavily each year on the changing load characteristics of the transmission system. In the year 1907 the first major pipe line of the company was constructed to transport gas from the Hogshooter and other fields near Tulsa to the Oklahoma City market. With depletion of these sources and discovery of new sources near Oklahoma City, this line is now and for many years has been used to transport gas from sources of supply near Oklahoma City to partially supply the Tulsa market. Thus, a transmission situation has been completely reversed with a minimum of effort. However, most situations are not so easily solved. Fig. 1 is a graphic presentation of the volume of gas transported by the transmission system during the year 1938. This gives an idea of the importance of various markets and of supply sources. Fig. 2 is a graphic presentation of the volume of gas transported by the transmission system on February 21, 1939, the peak day of that year. Comparing the two charts gives a relative view of the flexibility of the transmission system. This flexibility must be maintained through construction work connecting new fields as needed, and, by making other changes in the transmission system in order that the full benefit of the new supply sources may be obtained.

*This article was prepared in conjunction with R. W. Ducker, general superintendent; E. J. McConnell, chief engineer; G. P. Estill, superintendent of gas measurement; E. C. McAninch, chemist, and B. C. Adams, Jr., engineer.

Program Planned in Advance

Each year the construction program for the next 12 months is decided upon and scheduled. Some years this involves major transmission-line extensions and always involves minor but important renewals, extensions, retirements, etc. In the past 4 years three lines of major importance have been constructed to connect huge sources of gas supply. Approximately 76.5 miles of pipe have been used in these jobs in sizes varying from 6-in. to 12-in. diameter. Twenty-one and five-tenths miles of pipe line were constructed from the Cement fields to the general transmission system; 38 miles of pipe line were constructed between the city of Enid and the Lovell, Marshall, and Crescent fields; and 17 miles of pipe line were constructed from the South Stroud field to the general transmission system.

During the summer of 1940 a construction program was completed, which involved an estimated expenditure of over $400,000. The program consisted of seven separate items of which two are major transmission-line extensions. The first of these major items provides for an extension of a parallel line from Tulsa to the South Stroud line junction. This installation calls for 9 miles of 12-in. pipe and permits the removal of 4½ miles of 12-in. pipe now used to connect the western extremity of the existing parallel pipe system. The second of these major items provides for the installation of 20 miles of 10-in. pipe from the Crescent field to the general transmission system connecting just north of the town of Edmond. In addition to these jobs, the main transmission line from Oklahoma City of Tulsa, approximately 120 miles of 12-in. line, will be tested and repaired; an additional loop line will be installed in a river crossing between the Cement fields and Oklahoma City; an existing line circuiting Oklahoma City will be reconnected so as to bring Cement field gas to markets north of that city; and, an additional loop line will be installed in a main transmission-line river crossing just outside Tulsa.

This work will increase the capacity of the transmission system by 25,000,000 cu. ft. per day and provide even greater flexibility in operation. It is also likely that, in the future, the company will become more and more dependent upon gas fields in western Oklahoma as a source of supply and can, therefore, expect to make increases in the capacity of the transmission system between Oklahoma City and Tulsa from time to time. The line from the Crescent field will be used to transport gas to the general transmission system, but, upon depletion of that area, will be used to transport gas from the general transmission system to the Enid market. It is probable that the gas reserve contained in the Crescent area is sufficient to deliver an appreciable volume of gas into the general transmission system for at least 10 or 15 years.

(Continued on Page 119)

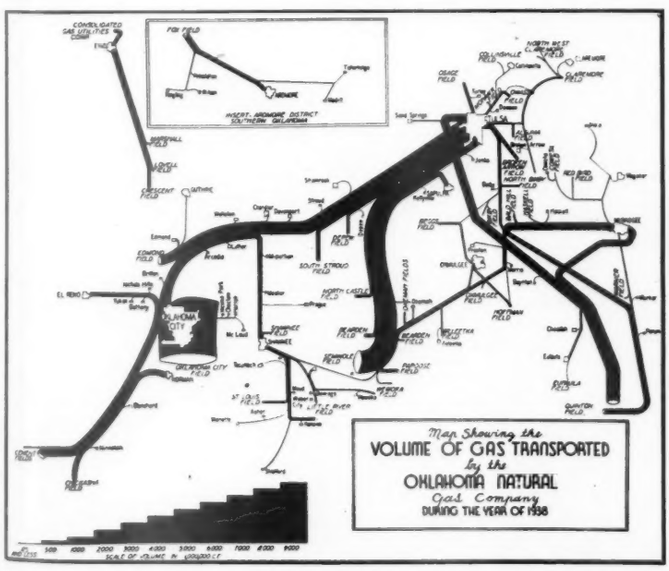


Fig. 1

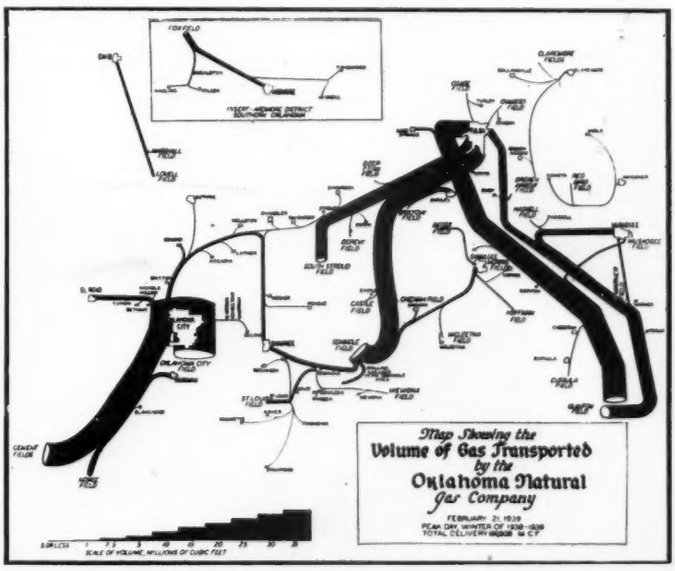


Fig. 2

CLARK 800

in new combination Gasoline P

Rear View CLARK 8-Cylinder, 800 H.P. "Angles" in El Paso Natural Gas Co. plant, at Jal, New Mexico.

CLARK 8-cylinder, 800 H.P. Super-2-Cycle Right Angle Compressor.

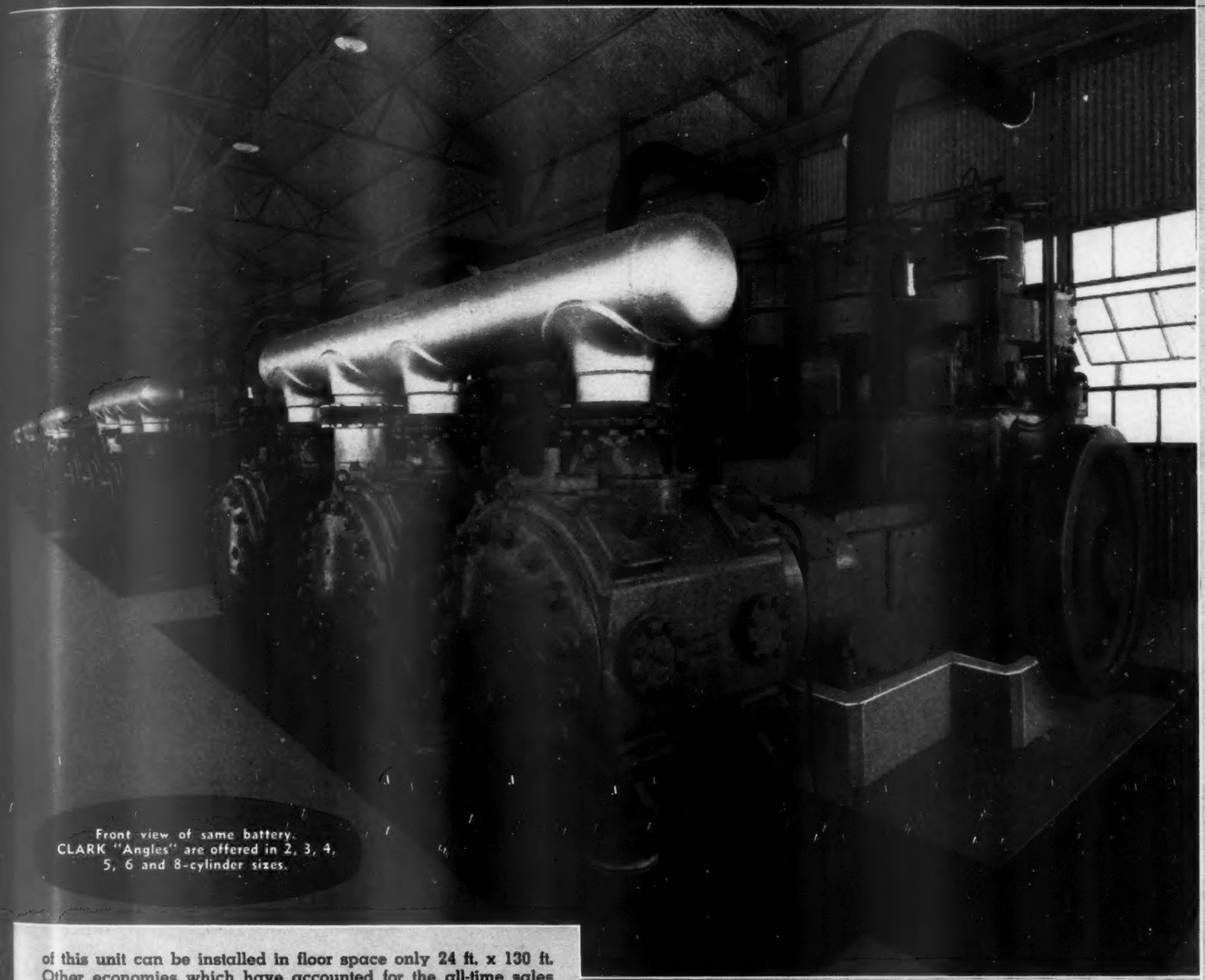
FIVE of the new 8-cylinder, 800 H.P. size CLARK Super-2-Cycle "Angle" Compressors — totalling 4,000 H.P. — were ordered and are now in service in the new combination gasoline plant and gas booster station of the El Paso Natural Gas Company, at Jal, New Mexico.

Built by the construction department of the El Paso Natural Gas Company, this new plant is one of the largest of its kind in the industry, having been designed to handle a maximum of 85,000,000 cu. ft. of gas daily. It takes gas from the wells at 19.2 lbs. pressure, strips the gasoline from it, and puts it into the trunk pipe line at 562.2 lbs. pressure.

The CLARK "Angle," due to new features and compact design, introduced several important economies. The new 8-cylinder unit represents a still further gain in compactness. 4,000 H.P.

H.P. "ANGLES"

e Plant and Gas Booster Station



Front view of same battery. CLARK "Angles" are offered in 2, 3, 4, 5, 6 and 8-cylinder sizes.

of this unit can be installed in floor space only 24 ft. x 130 ft. Other economies which have accounted for the all-time sales record of the CLARK "Angle" are: Reduced transportation and erection costs, due to shipment assembled; saving of one-third in fuel due to CLARK Fuel injection and 26% excess scavenging air; lowest maintenance due to simplicity of design.

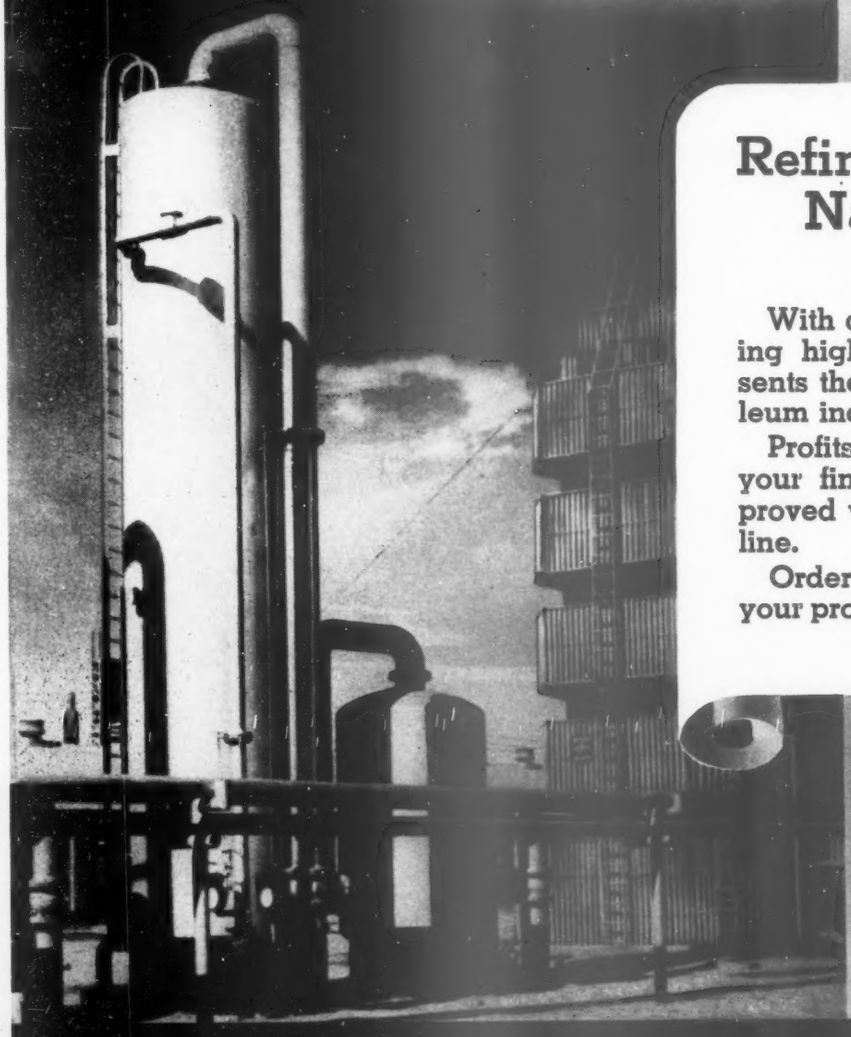
Before selecting your next compressors allow us to fully explain the economies which have sold 200,000 horsepower of CLARK "Angles" in only 4 years.

CLARK BROS. CO., INC. . . . OLEAN, NEW YORK, U.S.A.

Export Offices: 30 Rockefeller Plaza, New York. Domestic Sales Offices and Warehouses: Tulsa, Okla.; Houston, Texas; Chicago, Ill.; Boston, Mass. (131 Clarendon St.) West Coast Offices: Smith-Booth-Usher Co., Los Angeles, Cal. Foreign Offices: 72 Turnmill St., E. C. 1, London; 4 Str. General Poetas, Bucharest, Roumania.

CLARK

ALL PROFIT IS NOT MADE IN SELLING



Refiners! Natural Gasoline Is Your Best Buy

With crude oil prices firm and moving higher, Natural Gasoline represents the best buy in the entire petroleum industry.

Profits are sure, plus the fact that your finished product is greatly improved with the use of Natural Gasoline.

Order Natural today and increase your profit.

JUST NATURAL WARREN GASOLINE TULSA - OKLA.

WARREN PETROLEUM CORPORATION, Tulsa, Okla.

Manufacturers, Exporters and Marketers of Natural Gasoline

Export Terminals: Corpus Christi, Port Arthur and Norsworthy, Houston, Texas and Marcus Hook, Pa.

Economy and improved control in certain operating practices have been offered to gas companies through newly developed types of pressure-control equipment. Leakage, an old problem to every gas company, can be minimized if line pressures are reduced to the point that will still provide sufficient volume for consumers. It is also necessary that additional volumes of gas be available when they are needed. Pressure boosts to provide the additional gas are manually controlled at pressure-regulating stations and must be made in advance of expected demands. Manual control involves the element of personal judgment and the ability of the employe to provide the pressure boost where and when needed. Predicted cold waves often do not materialize with the result that excessive pressures are maintained to the detriment of both consumer and company. Conversely, unexpected cold waves may occur, catching the company at a disadvantage and causing extraordinary effort to keep from inconveniencing consumers. Experimental installations of new automatic types of equipment have been made in order to determine whether the problem of manually controlling pressure can be eliminated.

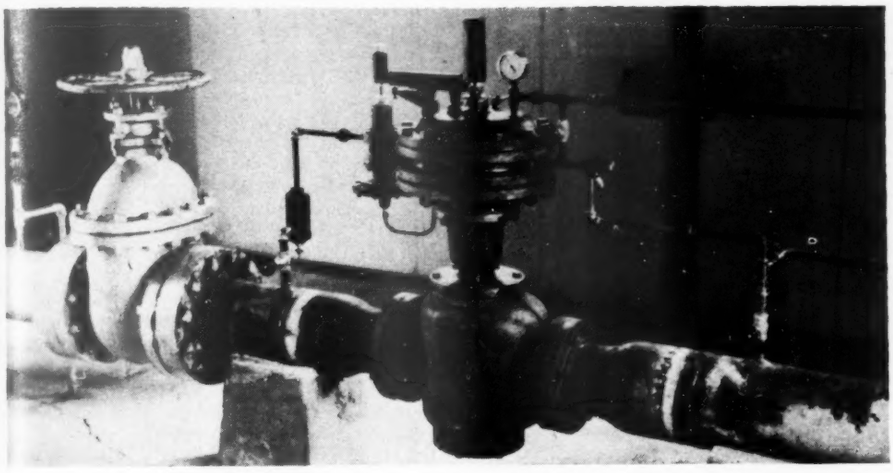


Fig. 3—Booster regulator reducing transmission-line pressure to intermediate distribution-line pressure

Booster Regulator

One new device is known as a booster regulator. It is generally used by this company to reduce from transmission-line pressure to intermediate distribution-line pressure, or from one transmission-line pressure to another. The purpose of the regulator is to increase the outlet or downstream pressure as demands on the line are increased. Inasmuch as line pressure drops when the volume of consumption from a line exceeds the volume of input to the line, the rate of consumption appears to be the logical factor through which to control the input volume and thereby the line pressure. The velocity of gas thus passing the regulator is used in this device to control the pressure. A restriction in the pipe line near the regulator creates a differential pressure, the amount of which depends on the gas velocity. This differential then controls the regulator valve by opening or closing it, thus passing either more or less gas, which, in turn, raises or lowers the outlet pressure. As the volume of gas being used increases, the regulator valve opens further, and more gas is passed into the line which raises the outlet pressure of the regulator. As the volume of gas being used decreases, the regulator valve partially closes, and less gas passes into the line, which lowers the outlet pressure of the regulator. It has been found that, if more than one of these regulators supplies the same pipe-line system, one regulator will tend to supply the entire pressure boost, making other similar regulators partially ineffective for boosting purposes. For this reason, these regulators have been installed for towns having only one supply station. At present, the towns of El Reno, Ardmore and Yukon have this equipment, reducing main transmission-line pressure to intermediate distribution-line pressure. Three installations have been made on transmission lines to reduce main-line transmission-line pressure to secondary transmission-line pressure. Operating results have been satisfactory and other installations will be made as the need arises.

Another of the new pressure-control devices is the time-temperature pressure control. This is used in distribution systems to reduce from intermediate distribution-line pressure to low distribution-line pressure. The purpose of this regulator is to maintain a set pressure during normal operation, but reduces the pressure at certain times each day when gas consumption is at a minimum, and increases pressure during cold periods when house-heating loads are high. A timing device on the regulator allows the pressure to drop to that required for low demand during the night hours. A temperature device increases the pressure above normal operating point as atmospheric temperature drops below a predetermined value. This, then, supplies additional gas during the colder periods to meet the increased heating load. The time and temperature devices do not counteract each other since the time device controls during the night and the temperature device controls during the day and evening. Another device limits the pressure increase to a set maximum value. This equipment is used at pressure-regulation points within a city or town to provide adequate volumes and pressure to consumers and to eliminate the problem of manual operation. Distribution-line pressures can be adjusted for normal operation with the knowledge that pressure will be reduced during the night when consumption is at a minimum and that normal pressure will be provided before the daytime consumption begins. Also, sudden cold waves will increase the pressures and volumes of gas available for consumption at the time needed. At present, 19 of these regulators are in service, being located in the towns of Ardmore, El Reno, and Yukon. Surveys have been made and installation of similar equipment will soon begin in the towns of Norman and Wagoner.

Fig. 4—Time - temperature pressure control reducing intermediate distribution - line pressure to low distribution-line pressure

Fig. 5—Timing device (right), maximum - pressure - increase regulator (center), temperature device (left) on time-temperature pressure control

Results From Boosters

The beneficial results obtained through installation of boosters and time-temperature controls have offset their cost. Expense of operation has been reduced, due to the automatic features of the regulators, reduction of leakage attributed to average lower line pressures, and to fewer customer complaints. Additional installations will be made where surveys indicate that economic conditions and utilization will be benefited.

Dust in transmission and distribution systems has always been a problem which recently has demanded special attention. Its effect causes disturbances in pressure-regulating and measurement equipment and is sometimes the cause of pilot-light failures and inefficient use of gas by consumers. Many types of dust removers have been used for years with varying degrees of success. When this company learned of experiments being conducted using glass-wool as the filtering medium, several dust removers were built using glass-wool. Observations on operation led to development of design by our own engineers and resulted in a greatly improved type of filter case using two filter elements. This equipment has been patented and the patent is now owned by the Oklahoma Natural Gas Co.

(Continued on Next Page)

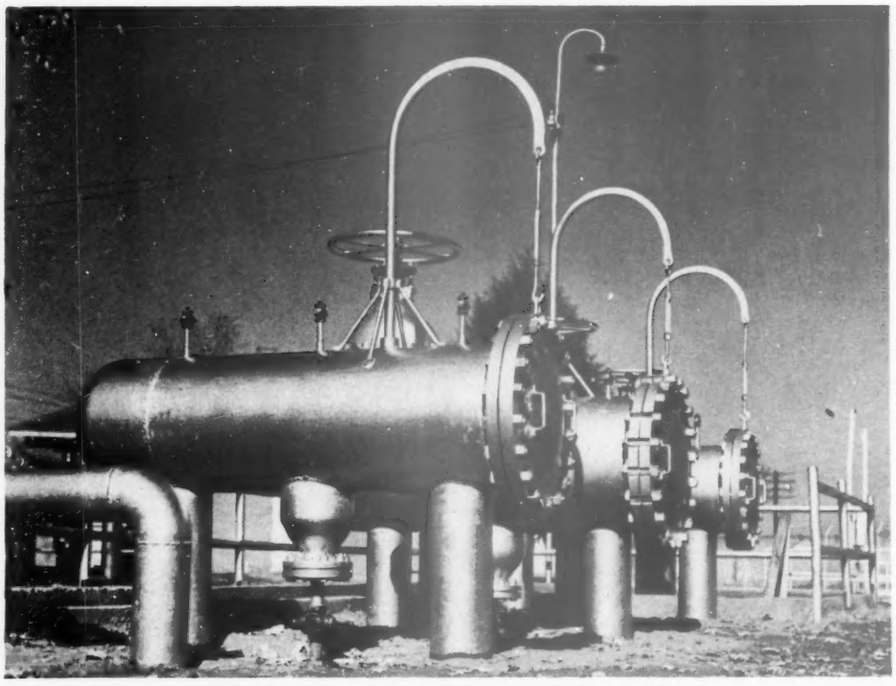


Fig. 6—Dust removers in service at a high-pressure supply-line terminal

The filter case is made of 8 to 20-in. diameter pipe being approximately four times the diameter in length with a welded dished head on one end and a bolted flange on the other end. The case rests in a horizontal position with the inlet line entering horizontally in the center of the case and two outlet lines dropping vertically from both ends to the outlet line. A dust reservoir drops vertically from the center of the case to catch large dust particles dropped from the gas. The filtering elements are placed in wire-mesh holders designed to avoid channeling between the elements and the case, and are held in place by a steel rod inside 1-in. pipe. Compression of the elements can be equalized through adjustment of the pipe at the flanged end. Pressure drop through these removers can be expected to reach 30 in. of water under adverse conditions. Their use is limited to lines carrying 5-lb. pressure as a minimum and up to the working pressure of the filter case as a maximum. Installations have been made on transmission lines, high-pressure supply-line terminals, and high-pressure industrial-customer services.

Operating Results

Results of operation have shown a marked decrease in distribution-line dust problems and less difficulty, due to the dust, has been experienced in pressure-regulating and measurement equipment.

Each year brings new problems and new solutions to these problems. The markets and supply sources of the Oklahoma Natural are widely scattered throughout the state and require a vast network of pipe lines. Additional markets and supply sources are constantly being added and require that construction work be kept up to date. Each new pipe line tends to unbalance the load characteristics of the transmission system and other changes must be made in order to retain a load balance between markets and supply sources. Lines must be of a size sufficient to transport many times the normal volume delivered through them, in order to be able to satisfy cold-weather peak-load demands and to maintain flexibility of the system. New equipment is constantly being developed which effects operating economies and improves the quality of gas service to consumers. This company experiments with such equipment until its worth is proved or disproved. Such proved equipment is then installed in locations where its use is warranted. This constant effort in the improvement of construction methods and operating practices results in direct benefits to consumers in their use of gas and in the assurance that their gas service will continue satisfactorily for many more years.

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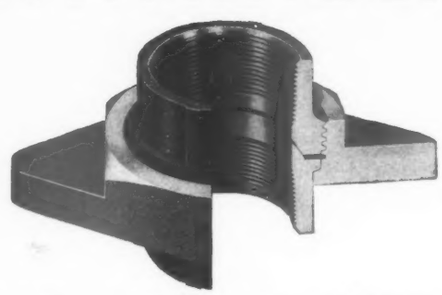
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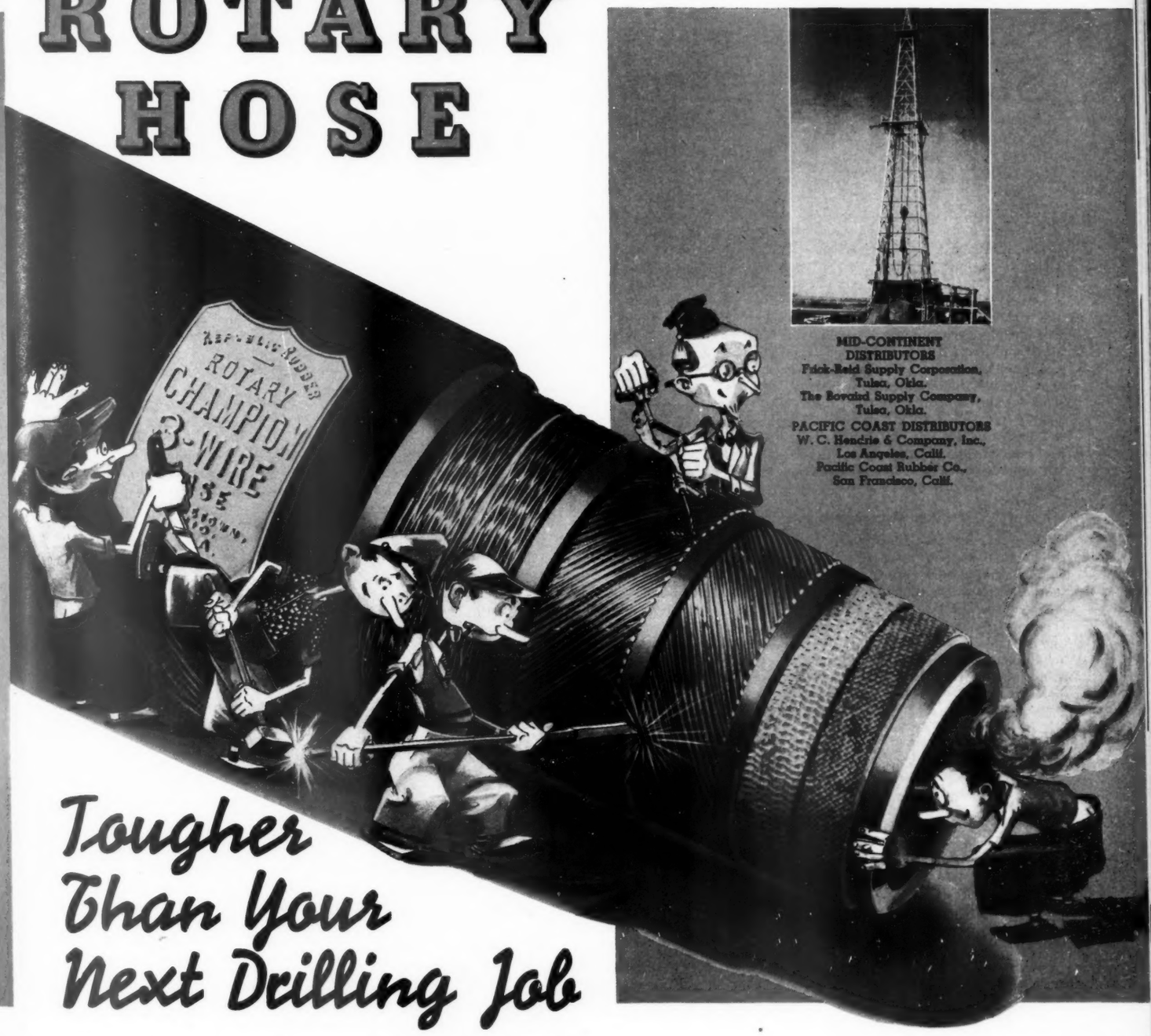

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Automatic and Remote Station Control

By J. A. BEYHAN
General Superintendent, Mid-Continent Pipe Line Co.

FOR the past 1½ years our chief engineer, F. E. Pyeatt, Jr., and our superintendent of telegraph, H. D. Bennett, have supervised the installation of various types of automatic controls on small gathering-line-station units over our system in order to effect continuous operation without the constant personal supervision of an operator. Presumably, most companies have much the same situation where it is found that a certain job or operation requires a few more hours each week than is permissible under the present conditions, while at the same time the job itself would not justify the services of a relief operator in order to handle the amount of oil required; therefore, a system of automatic controls to operate safely without regular or continuous attendance was devised.

Switch Equipment

The following is a typical setup of a high-speed gas engine driving a piston pump, operating with station tankage. Six control switches are wired in the battery circuit in series with a magnetic valve in the gas fuel line. The six switches are (1) a mercury switch controlled by high discharge-line pressure; (2) a mercury switch controlled by low discharge-line pressure; (3) a mercury switch controlled by engine lube oil pressure; (4) a mercury switch controlled by engine jacket water temperature; (5) a time switch and (6) a relay operated from another station via the simplex side of the telephone circuit.

If a drop in pressure is noted at any time, the stations pumping are first checked to ascertain if the pumping equipment is still operating before the shutdown is ordered or the lines involved covered by linewalkers. This check is made by what we term a "listening post." This listening post consists of a relay operated by two voltages and different resistances, a double contact relay. One contact opens a magnetic valve and is operated on a 125-volt direct current. The other contact is operated by a 55-volt current. This operation connects the high-frequency transmitter and the telephone circuit, which permits the operator at the distant station to listen in on his telephone receiver so that he can plainly hear the pump and engine running. If he hears the pump and engine running but he is not receiving his oil, he can be sure there is a break either close to the receiving station or at a distance far enough from the pump station so that it would have no effect on the high-pressure relay. He can then throw his contact switch over to the high-voltage switch and shut the station down until the line repairs are completed.

By using these relays on the different resistances from the telegraph relays, it allows us to use our simplex telegraph line as a telegraph line between the operating station and the central office. The magnetic gas valve is open on closed battery circuit and shuts on the failure of this circuit, so that being in series with the six above controls, the opening of any one of them will cause the valve to close off the fuel gas and thus shut down the unit. The operating point of all the control switches, with the exception of the relay, is adjustable to conform to different operating conditions. For emergencies all controls are bypassed with a toggle switch. In normal operation the field gager, after checking oil, water, etc., starts the unit and sets the time switch to shut down after pumping out the required amount of crude. He then notifies the dispatcher when the unit is scheduled to shut down and he is free to go about his regular duties. The unit runs out its scheduled time with protection against discharge line and engine trouble, and it may be shut down from the remote station in an unforeseen emergency.

Pump units of the same type in field gathering-line service are usually controlled by time switch only, except that the usual engine safety switches operate to sut down on lubricating oil and jacket water danger points. On these installations the gager sets the time switch to shut down after pumping out the oil on line and he is thus saved a return trip to the pump. In cases where several of these units are pumping into the same line, it allows the gager to arrange a pumping schedule to avoid excessive pressure on the line.

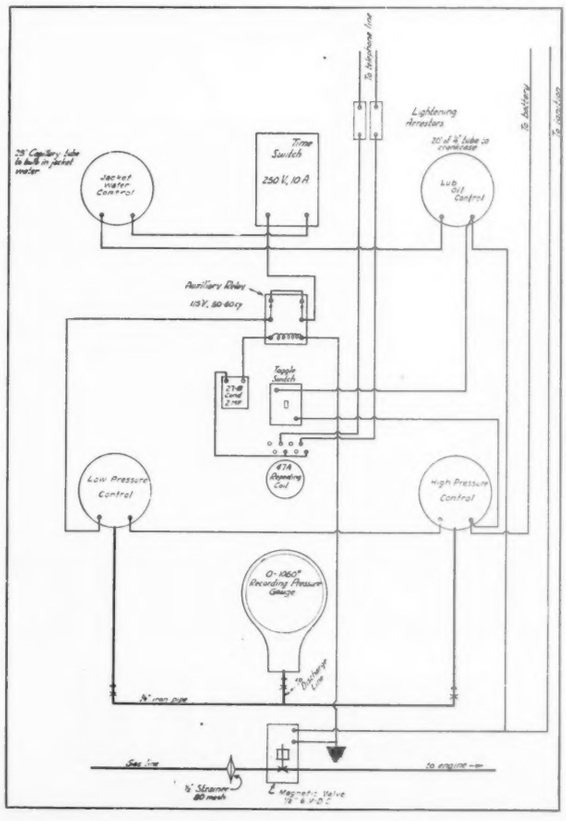
Method of Operation

Older type slow-speed horizontal gas engines with sight-feed lubrication and open water-cooling systems are equipped with controls for high and low discharge-line pressure, time and remote shutdown. The magnetic gas valve on these installations is manually latched open and closes on current impulse; a relay then operates to open the circuit to prevent drain on the dry cells providing current. Engines of this type are run under automatic control for limited periods only, determined by the lubricating-system capacity.

All such controls have proven dependable and trouble free and have made possible substantial savings in labor-attendance costs.

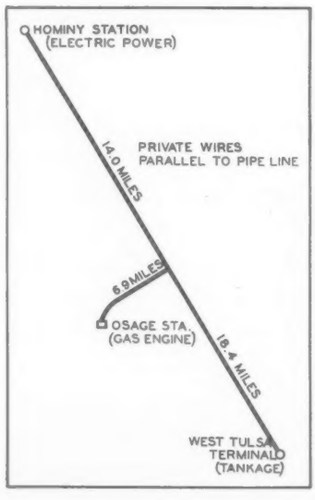
Slow-speed oil engines driving plunger pumps in main-line stations are provided with a magnetic valve on the fuel-oil line operated by a mercury switch controlled by discharge-line pressure. These valves operate on dry cells or 110-volt a.c. current. They are normally open and will close on current impulse. In operation, a high discharge-line pressure closes the mercury switch, thus closing the magnetic valve and shutting down the engine by cutting off the fuel supply. The resulting lower discharge-line pressure allows the mercury switch to open, which opens the magnetic valve after the engine has stopped. This has proven more satisfactory and economical to provide protection against excessive line pressure than spring loaded relief valves on the pumps.

We believe this unit-control system is the better plan, as in many instances we have smaller discharge lines cutting into our main line and, should a break occur in this feeder line, the unit would immediately shut down; or, if a gate valve is closed on the feeder line at some point between the pump station and the main line, it also shuts the station down and does not interfere with the operation of main-line pump stations or other feeder stations pumping into the main line. In the event of the pressure rising and all stations being shut down, it would be known that the trouble was at the receiving end of our line or in the manifold at our West Tulsa refinery. In other words, this enables us to locate our trouble without spending a lot of time looking for it.



(Left): Diagram of circuits for automatic and remote control of pumping station

(Below): Map showing relation of Osage station, equipped with electrical controls to the pipe-line system



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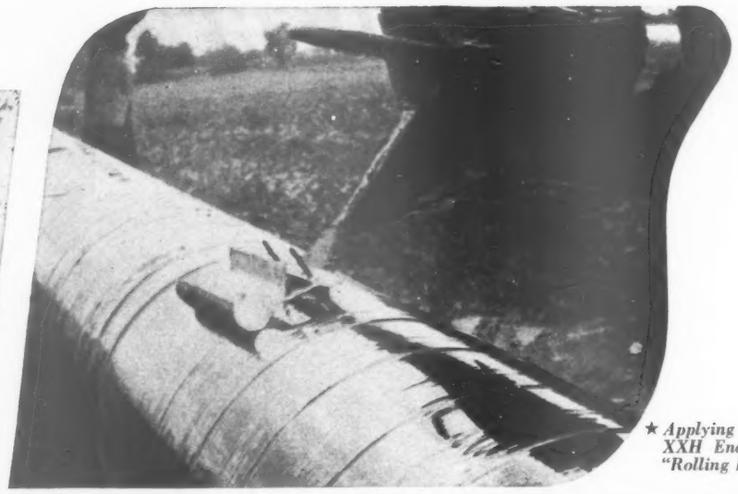
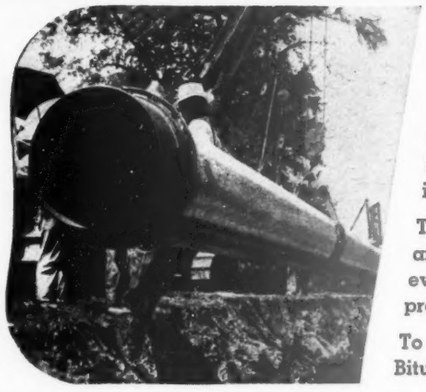


★ *Applying Bitumastic XXH Enamel by the "Rolling Rig" Method*



★ *Placing Pipe over Ditch Prior to Installing Dresser Couplings*

A 55-mile, 24-inch, outside-diameter, natural gas transmission pipe line is being laid in Indiana by the Michigan Gas Transmission Corporation—a subsidiary of the Columbia System.

The line consists of two sections, the first of which runs from Montezuma, Indiana, for 15 miles, where it connects with an existing transmission line. Six miles beyond this point, the second section starts and runs for 40 miles into the Zionsville, Indiana compressor station.

The pipe is National Seamless Steel, with 5/16 of an inch wall thickness and weighing approximately 80 pounds per linear foot. Joints are welded every 80 or 120 feet and Dresser Couplings are then applied. The operating pressure will be 600 pounds per square inch.

To protect the pipe line against soil corrosion, it is being coated with Bitumastic Priming Solution and Bitumastic XXH Enamel (applied hot).

Because of the nature of the country, the hot Bitumastic Enamel is being applied by the "rolling rig method," except for the field bends. These bends are being coated by the "sling method." For protecting the Dresser Couplings, Bitumastic Coupling Coating is used.

As an added precaution to protect the pipe line from deterioration, a double thickness of 15 lb. coal tar saturated asbestos pipe line felt, 24 inches wide, is being applied on top of the coated pipe line after it has been placed in the ditch. This protects the coating against damage during "back filling" and from unequal soil pressure.

The coating of this pipe line with Bitumastic Enamel is another example in the long list of steel oil and gas pipe lines protected by this world famous coating.

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Vapor-Phase Engine Cooling Introduced on Pipe Lines

By T. P. SANDERS

DURING the past month three pipe-line stations in widely separated oil-producing states have been equipped for vapor-phase high-temperature engine cooling. These installations represent the first pipe-line use of this type of cooling, and while none of them is notable for either size or intricate application, they are important because they will undoubtedly suggest new avenues toward greater economy to the imaginative operator.

First application was at a station near Guernsey, Wyoming, owned by Rocky Mountain Pipe Line Co. At this station the two 125-hp. gas engines, which pump 13,000 bbl. of crude per day, were both equipped for vapor-phase high-temperature cooling, thereby solving a serious operating problem brought on by the mile-high altitude and a poorly ventilated engine house.

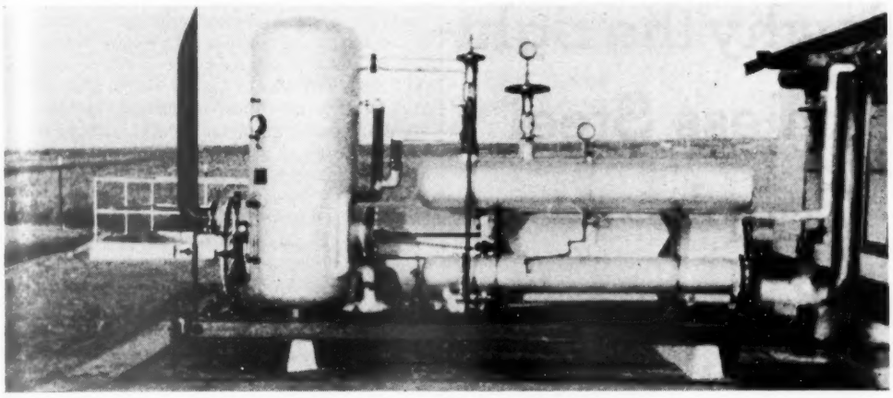


Fig. 1—A crude-oil pumping station in Wyoming uses this equipment in utilizing waste engine heat. A small portion of the crude from the line passes through the small still where it is heated by exhaust gases to drive off gas for fueling the engines

The second application was at Stanolind Pipeline Co.'s station near Prague, Okla., where a 60-hp. gas engine was equipped with the new-type cooling system. The third installation is on a 55-hp. engine at Oklahoma Pipeline Co.'s Louden station near St. Elmo, Ill.

Vapor-Phase Cooling

After two years in the experimental stage, high-temperature cooling has progressed into its very early commercial life. When it becomes better established it will probably be considered the greatest stride in internal-combustion-engine progress in many years. In simplest terms it consists in supplying water to the engine jacket at or near the boiling point so that after the engine's heat is absorbed and the fluid emerges from the block, a slight decrease in pressure will cause the waste heat to be liberated in the form of steam. This steam is condensed in a radiator or heat exchanger so that the condensate can be pumped back into the system to complete the cycle. By forcing the fluid through the jacket at a rapid rate, which is accomplished because of having the circulating pump under a constant head, hot spots are avoided and a more uniform temperature is maintained over the lengths of the cylinders.

When experimental work first began with vapor-phase cooling it was noted that although the water was supplied to the engine block at a much higher temperature than in the conventional cooling system, oil temperatures in the crankcase were appreciably lower. For some time this phenomenon beggared explanation, and the theory was advanced that this lowering of the crankcase temperature was the result of reducing the mechanical losses in the engine through decrease in oil drag. Within the past 2 weeks a search through heat-exchange data disclosed the fact, well known in some quarters, that the rate of heat transfer from steel to water increases as the temperature of the water increases. In the case of engines this increase in the rate of heat transfer is more than enough to compensate for the decreased temperature differential between the metal and the water. Therefore, although the water is supplied to the block at a higher temperature, it absorbs heat faster.

Explanation for the ability of hot water to absorb heat faster than cold water appears to lie in the fact that the film strength or surface tension of the water is weakened with heating. A practical application of this fact is seen in the tempering of steel. In order to bring about the most rapid cooling, the steel is dropped into water at the boiling point rather than into cold water.

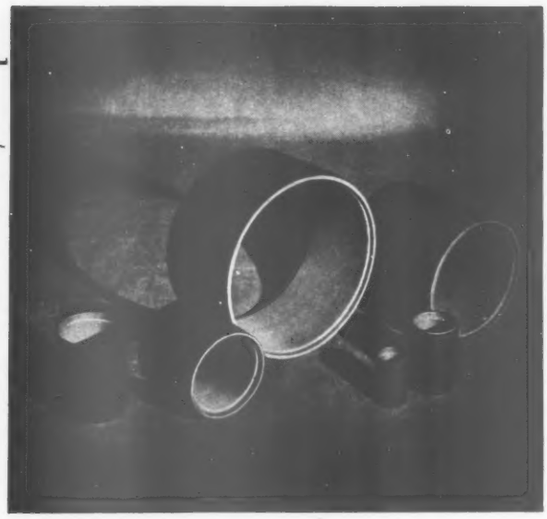
Wall Temperatures of Cylinders.

In their article published in The Oil and Gas Journal September 7, 1939, Page 58, J. H. Wallace and R. A. Newton showed that the upper ends of the cylinder jackets in an internal-combustion engine are always at boiling temperature while in operation regardless of the temperature of the circulating water. In other words, it is impossible to cool the tops of the cylinder liners with water without having boiling take place on the outer surfaces of these liners. Therefore, in order to reduce the temperature gradient between the upper and lower ends of the liners, it is necessary to increase the temperature at the lower ends rather than attempting to reduce the temperature at the head. By vapor-phase cooling the temperature differential over the length of the liners can be reduced more than 50 per cent, and since liner distortion is directly proportional to the temperature differential, the cylinder tapering due to temperature can be reduced more than 50 per cent by vapor-phase cooling.

Condensation on Cylinder Walls.

Combustion of hydrocarbons in an engine cyl-

Fig. 2—An installation of vapor-phase high-temperature cooling on a crude-oil pipe-line engine in Oklahoma. Cooling water is pumped to the block at near-boiling temperature



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inder produces carbon dioxide, carbon monoxide, water, and some small portion of sulfur dioxide. The quantity of water formed is surprisingly great, amounting to about 1 gal. per 10 brake horsepower-hours. Most of this passes through the exhaust valve as steam, but if the lower portion of the cylinder is below the dew point of water some steam will condense upon the cylinder wall in keeping with the rule: "When a gas containing a liquid vapor comes in contact with a surface at or below the dew-point temperature of the vapor, the vapor will condense upon the surface regardless of the temperature of the gas."

Moisture condensing on the cylinder wall will quickly absorb sulfur compounds from the products of combustion, since sulfur dioxide will combine readily with water to form sulfurous acid. When the rising piston scrapes the condensate off of the cylinder wall, it mingles with the oil film. The acid attacks walls, pistons, and rings, and also acts as an emulsifying agent to form a sludge which accumulates in the crankcase and builds up a thick gummy deposit on rings and pistons.

The greatest benefit derived from vapor-phase cooling comes as the result of raising the wall temperatures in the lower portion of the cylinders to a point where condensation is avoided. In several modern installations internal-combustion engines with this type of cooling are now operated on sewer gas or sour natural gas, both of which contain comparatively large portions of hydrogen sulfide. Even with fuel of this type sludge formation is reduced to an almost inconsequential amount. Since practically all motor fuels contain an appreciable quantity of sulfur compounds, operation on sour gas represents only an acceleration of the deteriorating influences at work in the average engine. An automobile equipped for vapor-phase cooling has been driven 25,000 miles without changing either the oil or the oil filter. The oil is still clear, save for a small accumulation of carbon particles.

Effect of Cooling Temperature on Efficiency.

Vapor-phase cooling can increase engine efficiency 3 or 4 per cent under full load, or up to 8 or 10 per cent under partial load. This improved efficiency is not the result of greater thermal efficiency, as may be assumed at first thought. Since combustion temperatures in engines often range above 4,000° F., differences in cooling-water temperatures can only account for a change in thermal efficiency of about one-half of 1 per cent. (The Oil

Fig. 3—Vapor-phase high-temperature cooling of an engine at a pipe-line station in the Rocky Mountains. By running this engine at a higher temperature, better cooling was accomplished because of the more favorable temperature differential

and Gas Journal, Sept. 7, 1939, p. 58.) Therefore the increased efficiency observed on dynamometer cards and in other tests of vapor-phase cooling is due to reduction of mechanical losses. The higher wall temperatures in the lower portion of the cylinders decreases oil drag and makes for better lubrication because of the reduction in sludge formation. Also, reduction of the temperature gradient from top to bottom of the cylinders serves

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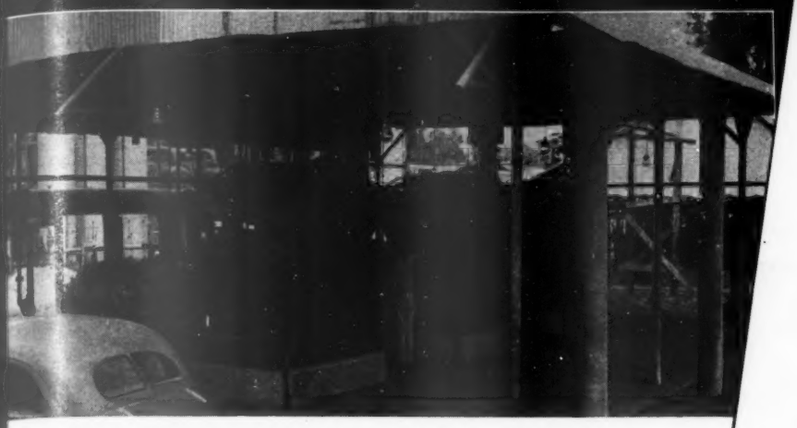
Or They Wouldn't Order More!



Royalite Oil Company, of Canada, was the first purchaser of Type G-MV compressors. Here are three more 400-hp units recently installed by the same company in South America.

Type G-MV compressor units have gone into many plants as "trial horses." Invariably, they performed so efficiently . . . pleased hypercritical owners so well . . . that orders for more G-MV's followed quickly!

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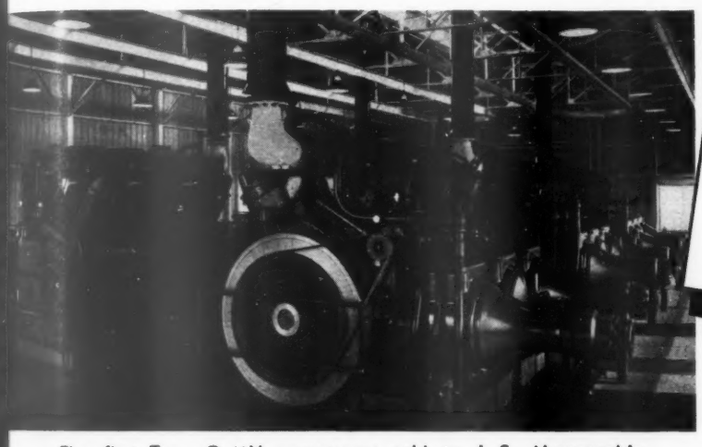
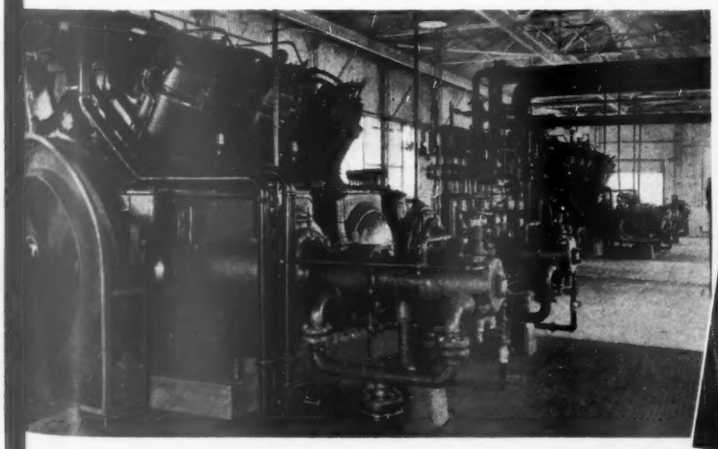
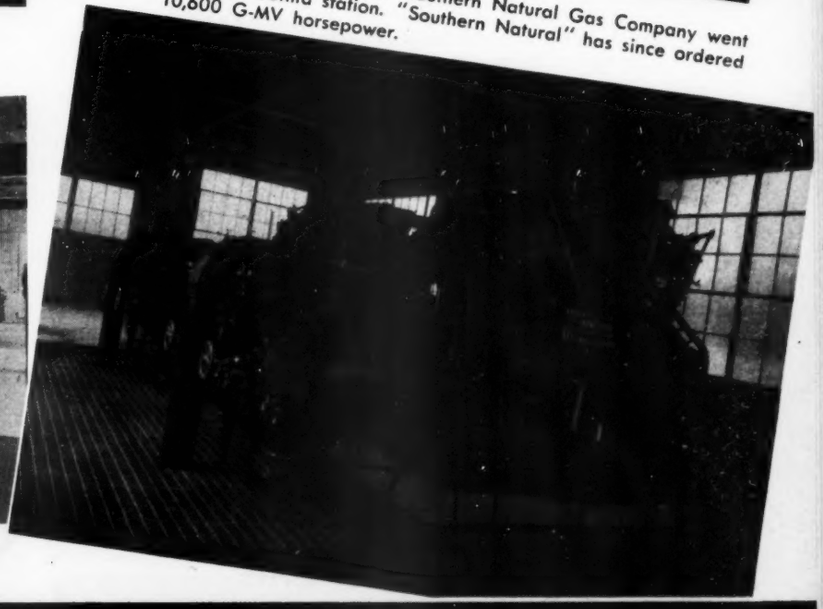


The first Type G-MV compressor sold to J. S. Abercrombie Company has been followed by thirteen more of these 600-hp units.

The first two G-MV's for Southern Natural Gas Company went into their Selma station. "Southern Natural" has since ordered 10,600 G-MV horsepower.



Four 400-hp Type G-MV's for Tide Water-Seaboard companies have been augmented by two "sixes" and another "four."



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to obviate some of the friction which results when piston rings are forced to expand and contact in a tapered cylinder.

Effect of Temperature on Lubrication.

In Great Britain diesel engines have been operated with a steam pressure of 125 lb. on the jackets—which means a cooling-water temperature of 353° F. Liquid-cooled aircraft engines often operate at 325° F. Since there are no serious lubricating problems, these examples serve to indicate that cooling-water temperatures between 200° and 250° F. are safe for all ordinary engines, providing that a sufficient rate of circulation is maintained. As explained above, lubrication is improved at these temperatures because of reduction in sludge formation. Also, it has been determined that in small stationary engines of all types the oil temperature in the crankcase is actually lower with vapor-phase cooling than with the conventional cooling system. This phenomenon is explained above.

All vapor-phase cooling systems now in use on pipe lines are of the radiator type. The circulating fluid is discharged from the block, entering what is known as a flash chamber. Here the steam flashes off and passes through the radiator where it is condensed and returned as solid water to the flash chamber. A pump draws solid water from the bottom of the flash chamber and recirculates it through the engine. The pump is under a constant fluid head, the flash chamber being located above the engine block, and since the water and steam occupy the same vessel, temperature regulation of the circulating water is maintained without thermostat controls. When the engine is started up, no cooling takes place until the water reaches the boiling point. Under steady operation with vapor-phase cooling it has been found that the temperature difference between entering and discharged water never exceeds 12° F. The average is about 6° to 8°.

In installations where the waste jacket-water heat can be utilized, the radiator is replaced by a heat exchanger in which steam is condensed. To date no use has been made of this waste heat in the pipe-line industry or in other branches of the oil industry, with the exception of the hydraulic oil-well pumping unit, but there is no lack of practicable possibilities.

In radiator-type installations the capacity of the radiator is greatly increased through the use of vapor-phase engine cooling, since it is used to condense steam rather than to cool water. At the Rocky Mountain Pipe Line Co.'s station near Guernsey, Wyo., vapor-phase cooling was adopted primarily to avoid overheating and loss of water. Because the engines at this station are located in a small engine house, part of the air drawn through the radiators is often 150°. Since water boils at about 200° at that altitude, the air passing through the radiators could not cool the circulating fluid sufficiently to prevent boiling on hot days. In other words, water had to be charged to the engines at 175° or less if boiling was to be prevented. After installing vapor-phase high-temperature cooling the radiators were called on only to condense steam, and the temperature differential was adequate for that purpose.

Waste-Heat Possibilities

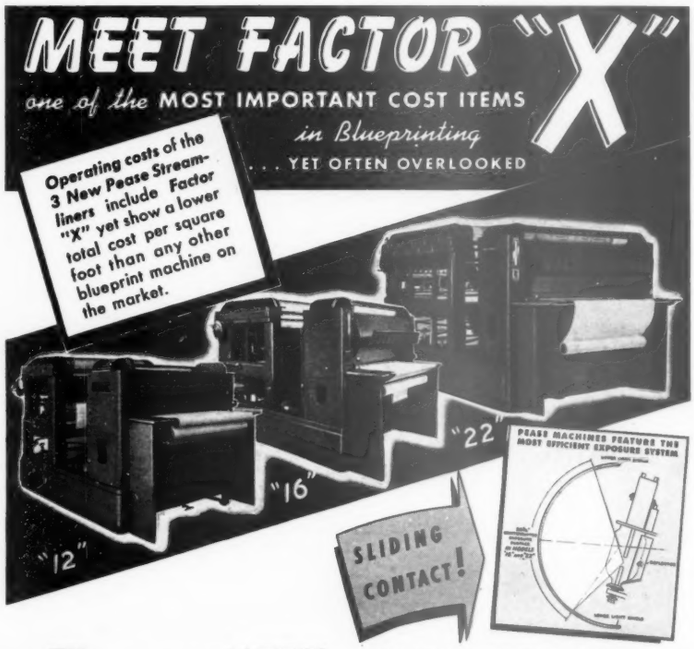
At one pipe-line station future plans call for use of a heat-exchange system whereby the oil passing through the station will be used to condense the steam from the vapor-phase engine-cooling systems. This would be accomplished with heat exchangers in the oil line. While the chief purpose in this case would be to remove the heat from the engine house, the possibility immediately suggests itself of using the same system far more profitably in stations where it is necessary to heat the oil for economical transportation because of its viscosity. It has been demonstrated that vapor-phase cooling of natural-gas engines makes available 4 to 5 lb. of steam at 220° to 240° F. and under a pressure of 5 to 10 lb. for each brake horsepower-hour of shaft load.

When vapor-phase cooling is installed, waste heat can be utilized with an efficiency never before realized. In the average internal-combustion engine 26 per cent of the heat units supplied by the fuel is converted to shaft horsepower, while 28 per cent of the heat is carried away by the jacket water and 34 per cent passes out the exhaust. When waste heat is taken from the jackets merely as hot water, it is very difficult to recover this heat at rates rapid enough to constitute economic practice. However, if this waste heat is available in the form of steam it can be condensed in a heat exchanger and thereby recovered at a very rapid rate. Recovery of waste heat from the exhaust gases is somewhat limited because it is undesirable to place any back pressure on the exhaust manifold.

A Wyoming crude-oil shipping station which is located many miles from a natural-gas supply uses a waste-heat recovery system to provide fuel for the gas engines. A small portion of the crude-oil stream is diverted through a small still where it is heated with waste engine heat to a temperature of about 200°. The light ends are driven off as gas to fuel the engines, while the remainder of the oil in the still reenters the main crude line in a continuous process. Ten per cent of the crude passing through the still is driven off as gas, but the volume used for fuel represents only 0.0007 per cent of the crude passing through the station. While exhaust gases are used at present to heat the oil in the still, it is believed that if the heat were supplied in the form of steam from vapor-phase cooling systems all fire possibilities would be eliminated.

Another strong possibility for practical use of waste engine heat on pipe lines presents itself in the case of gas lines. In late years refrigerating

(Continued on Page 165)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is the labor cost involved in producing blueprints—and here is a hypothetical example of the way it works.

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Therefore, in this example, *Factor "X"* or the number of labor hours required for the same number of prints, is reduced by 1/3 in the Pease Machine. And, in addition, although the Pease Machine uses 25% more amperage it operates only 2/3 as long for the same amount of work, thus it actually consumes 8 1/3% less current. It becomes obvious, then, that the Pease Machine operates at a much lower cost per sq. ft. of finished prints—prints of exceptional quality and flatness too.

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Fig. 1—Arc-welding on new line between Port St. Joe, Fla., and Chattanooga, Tenn.

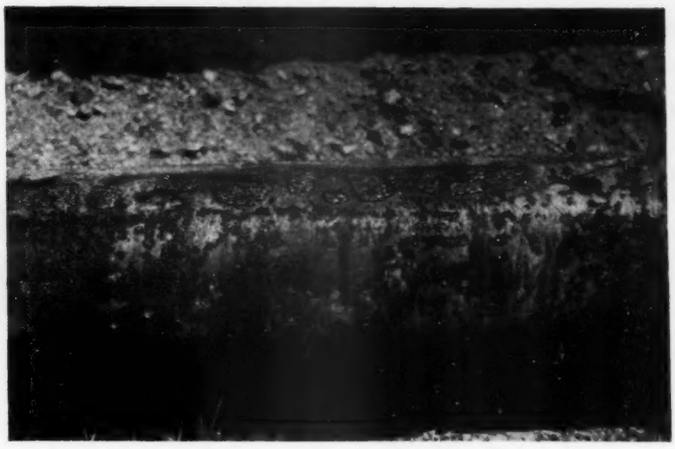


Fig. 3—Pitted section of pipe repaired by arc welding

Welding Technique in Vanguard Of Pipe-Line Building Progress

By A. F. DAVIS
Vice President, The Lincoln Electric Co., Cleveland, Ohio

ADVANCES have been made recently in pipe-welding procedure and equipment which benefit both pipe-line constructor and operator by enhancing the inherent quality, simplicity and economy of the arc-welding method of pipe-line construction and maintenance.

These advances include a new welding procedure which provides excellent stringer beads, having 100 per cent penetration and an inner appearance of smoothness and evenness of contour as though welded from the inside; a procedure for arc-welding stainless-steel pipe which provides welded joints equaling or excelling, in quality, the metal welded; a new procedure for welding old oil-line pipe, which overcomes difficulties previously encountered due to sulfur getting into the pores of the metal; and improved equipment, including arc welders, electrodes and supplies, which afford greater ease and simplicity of welding, together with improved weld quality and economy.

The procedure which has so greatly improved the quality of the stringer bead—important because of its effect on inner pipe surfaces—involves use of pipe beveled to a feathered edge, butting the pipe ends tightly together and welding with the electrode held so that the coating rests in the groove and the arc forces through the feathered pipe edges, putting the arc flame on the inside of the pipe. (Scarcely any arc light or flame appears on the outside.) Electrodes of ⅛-in. or 5/32-in. diameter (depending on pipe thickness) are used with fairly high current.

Welding starts at the top of the pipe and proceeds at high speed from top to bottom, producing a stringer bead of excellent quality. This procedure of stringer-bead welding, of course, follows the tack-welding operation which consists of making short welds at intervals around the joint to hold it for the stringer-bead and finish welding. The latter is accomplished by customary procedure for the particular method of welding employed whether it be stovepiping (each joint individually welded) or roll welding (pipe welded into sections on dollies, then tied into the line by bell-hole welding). Stovepiping continues as the preferred method for lines of 6-in. to 12-in. diameter and in rough or muddy terrain. For larger pipe, in flat, open country, the roll, or "firing line," method is usually employed.

Fig. 2—Rough going on the Southeastern's 450-mile gasoline line. Line consists of 340 miles of 8-in. and 110 miles of 6-in. pipe

For welding lines of stainless-steel pipe, the up-to-date procedure is as follows:

The pipe ends are beveled to 30°, leaving $\frac{1}{16}$ in. on the bevel and making a 60° V when the ends are butted together. Pipe ends are spaced slightly more than 3/32 in. and the first, or stringer, bead is welded with ⅛-in. "Stainweld A" electrode, making the weld by dragging the electrode around the pipe, being careful not to raise the electrode out of the bevel. (Holding a short, rather than a long, arc assures penetration to the bottom of the bevel.)

The second bead is then run in on one side of the pipe, halfway over the first, or stringer, bead. Then follows the third bead on the other side, uniting it and bead No. 2, followed by bead No. 4 on one side, No. 5 in the middle and No. 6 on the other, uniting all three. Bead No. 7 is then bridged

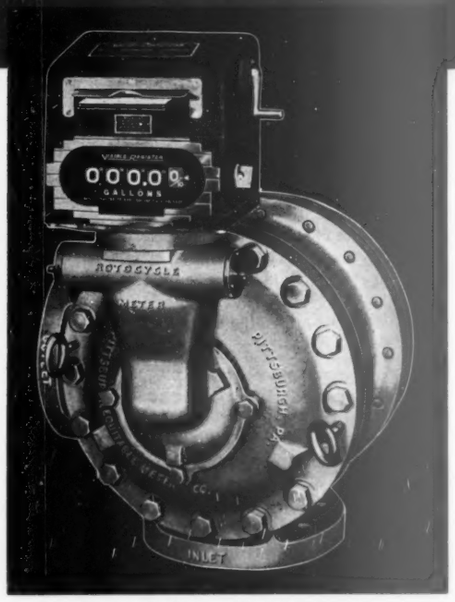
(Continued on Page 166)

Fig. 4—Arc-welding new half sole to badly corroded section of pipe

Fig. 5—Arc-welded repair of leaky pipe coupling

SHELL installs PITTSBURGH ROTOCYCLE METERS

on loading racks at



Rotocycle Meter, Model B-5, with Straight Reading Setback Register and Master Meter Duplicator.

THE selection of Pittsburgh Rotocycle Meters and Nordstrom Lubricated Plug Valves by the Shell Oil Company for pipe line terminal work is a tribute to the accuracy and thorough dependability of this equipment.

The Rotocycle Meter was accepted only after completion of a thorough study and exhaustive tests by the Shell Research organization. The Shell Oil Company have found, as have so many other major and independent oil companies, that meters provide the solution to the problem of speedy, accurate and dependable measurement on pipe lines, bulk plants and tank trucks.

There's a Pittsburgh Meter for Every Kind of Service

Pittsburgh Rotocycle for Bulk Plants, Tank Trucks

Pittsburgh Piston for Service Station Pumps

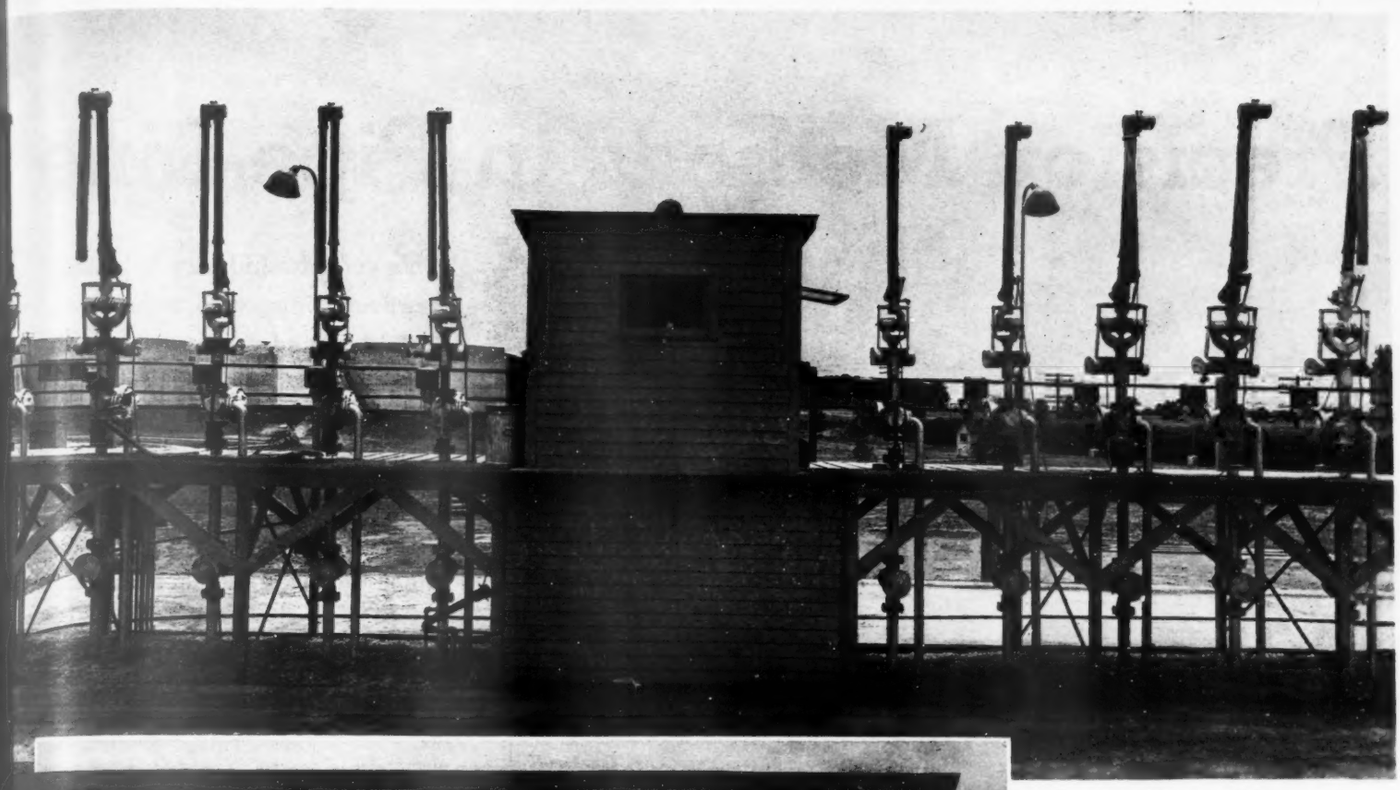
Pittsburgh Piston for Tank Trucks, Bulk Plants

Pittsburgh Grease for Lube Buckets

Pittsburgh Disc for Refinery and Industrial Services

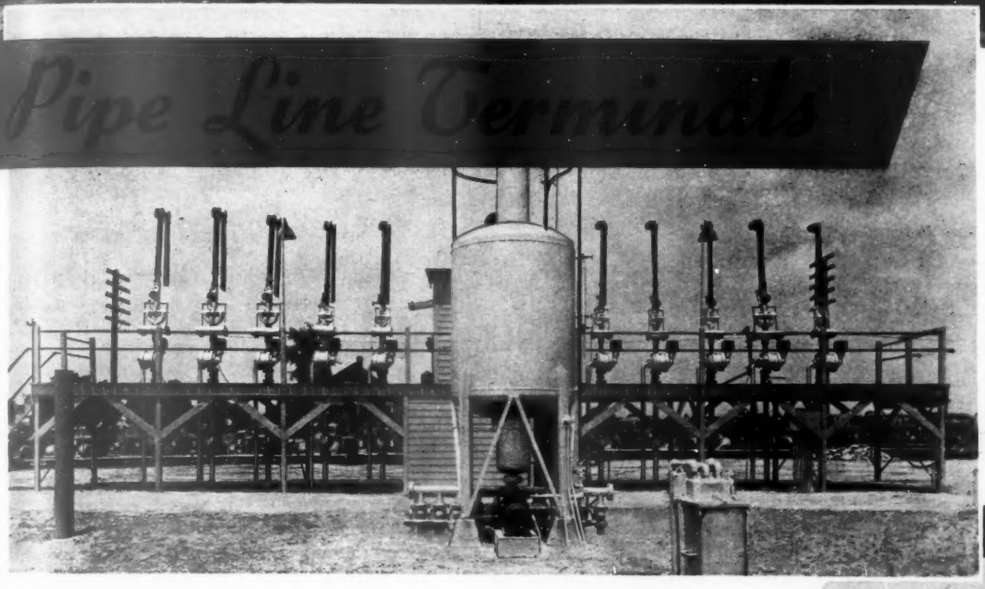
Pittsburgh Rotocycle for Pipe Line Service

THE WORLD'S LARGEST MANUFACTURER OF GASOLINE, OIL, AND GREASE METERS



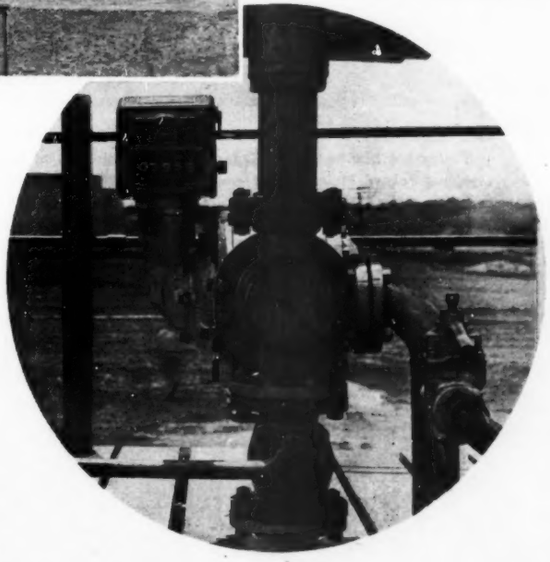
Ten No. 8 Pittsburgh Rotocycle Meters, on Nordstrom Valve controlled lines on Shell Loading Rack at Pipe Line Terminal.

Pipe Line Terminals



A noteworthy feature of this meter installation is the permanent proving tank, as shown at the left. By means of a unique manifold arrangement, it is possible to test the accuracy of each individual meter at will.

Close-up of one of the Pittsburgh Rotocycle Meters installed on Shell Loading Rack, showing inlet, outlet and prover connections.



The Pittsburgh Rotocycle is a rotary type meter having an operating mechanism consisting entirely of revolving parts. The construction is a distinct departure from all previously built meters and has a number of marked advantages.

The design of the Rotocycle is unique in that there are no valves or reciprocating pistons to impede the flow of the liquid through the meter. Measurement is accomplished as a continuous rotating cycle. Since the rotor assembly is mounted on ball bearings and no portion of it comes in contact with either the top, bottom or sides of the measuring chamber, friction in the working parts is almost negligible. For this reason there is balanced pressure throughout the meter and no slippage results. Liquid accordingly flows uninterruptedly through the meter with inappreciable loss in pressure or velocity. This continuous streamline cycle eliminates surging impulses and greatly reduces the pressure head normally required. The simplicity and ruggedness of the meter will appeal to the engineering minded as a notable advance in liquid meter design.

The complete story of the Pittsburgh Rotocycle Meter has been prepared in bulletin form. Write for your copy today.

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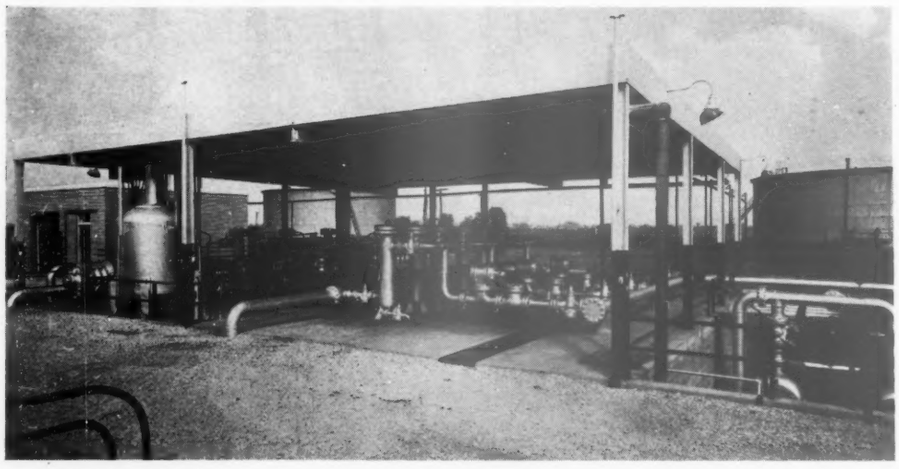
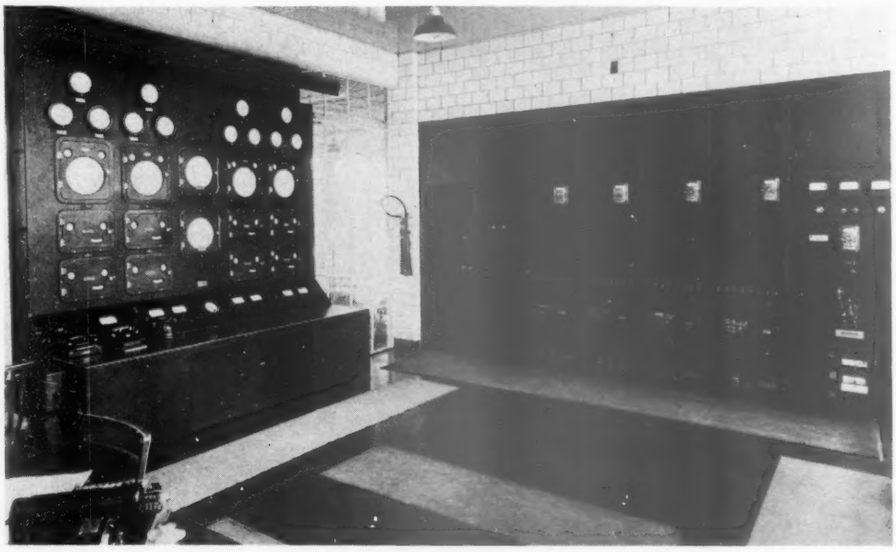
Precision Methods in Pipe-Line



Metering manifold at the pumping station located near the tank farm of the company's refinery at Wood River, Ill., which is the point of origin for refined products shipped eastward through the 8-in. pipe line



The master control room at the Wood River station (above) has equipment typical of what has been installed at the other stations of this gasoline pipe-line system. Below: Main pump room, equipped with motor-driven centrifugal pumps

This year the industry is taking particular interest in transportation of refined products through pipe lines. The Shell gasoline line, between Wood River, Ill., and Columbus, Ohio, moves five or six grades of gasoline, kerosene, gas oil, diesel fuel, and other tenders of special products.

THE gasoline, or "all products" line, is a comparatively recent innovation, the successful operation of which has placed new and more exacting demands on the shoulders of pipe-line engineers. The cumulative efforts of these men have brought forth a new technique which, for the lack of a better name, has been dubbed "precision pipe lining." We propose in this article to take a brief glance at an up-to-the-minute gasoline line which incorporates many of the improvements developed by builders of earlier gasoline lines as well as several which are believed to be unique with the line itself.

Shell Oil Co., Inc., has recently completed a line from its Wood River, Ill., refinery across Illinois and Indiana to Lima, Ohio, and from Lima to Springfield and Columbus, Ohio. The line is an 8-in. to Lima and a 6-in. beyond. It has a present capacity of 24,000 bbl. daily when pumping gasoline, but, when pumping heavier products such as kerosene or fuel oils, the capacity naturally decreases, depending upon the length of the heavy products tenders introduced into the line. The system embraces 449 miles of trunk line with eight terminals and four pumping stations. Two of the terminals, those at Zionsville, Ind., and Lima, Ohio, also act as pumping stations.

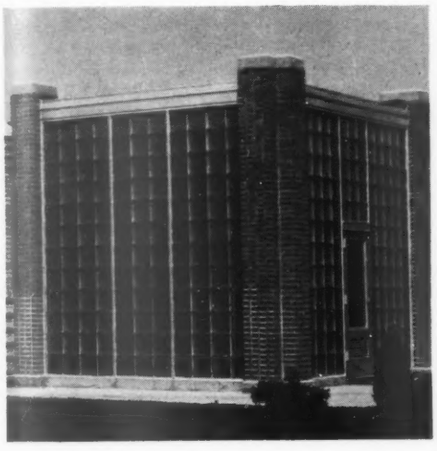
All pumping stations are electrically operated and consist of 350 or 500-hp. motors connected to 6-stage centrifugal pumps. With the exception of the initial station at Wood River, they are all automatically air controlled so as to match the pumping rate of the system. In addition, each has a pressure control of electric circuits to handle the start and stop of the station. Each station operates across a Vogt stop-lift check which automatically bypasses the station when the pump is inoperative. Set up to operate, a particular station will do so only when the downstream line pressure is above a point previously set (usually 375 to 400 lb). If this pressure exceeds a preset maximum, the station will shut down. Then again, if suction pressure falls below 10 to 15 lb. the pump will cease to operate. Any undue temperature rise in the motor bearings, pump bearings or glands, or case temperature, will also cause a shutdown.

Upon the pump being shut down by any of these automatic devices, an alarm rings and a light indicates the particular item which caused it. Marveling at the efficiency of the automatic setup, one bright individual claimed he would evince no surprise if it played "Yankee Doodle" and paid a jackpot. To date, there has been no instance of any automatic device having failed to function in its allotted task for the protection of the mechanical equipment.

Operation

By H. O'GARA
Shell Oil Co., Inc.

The plant facilities of the typical terminal on the line consist of all-welded breather-roof and pontoon-roof storage tanks of varying sizes to meet the product throughput requirements, a steel pump house, loading-rack equipment to service transport trucks, a tank-car loading rack, as well as office and housing facilities for personnel. Individual lines are connected to each tank in order to reduce possible contamination to a minimum and to permit flexibility in handling the shipping conditions. As a further precaution against contamination, an arrangement has been worked out whereby the stream from the trunk line cannot flow to two tanks simultaneously. Cross connections are provided in the pump house that permit transfer of products from tank to tank. The effect of this arrangement is to provide the maximum flexibility in terminal operation necessary to handle shipping demands that vary widely with the seasons.



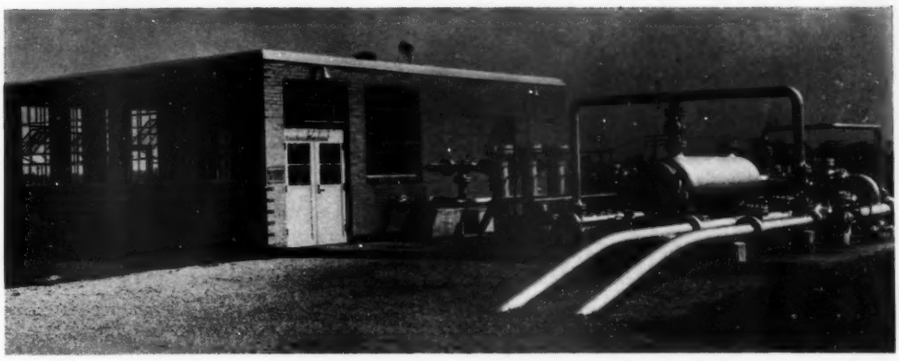
Part of Vandalia station showing detail of a type of building construction adopted for the system

Products are measured into and from the line by positive displacement meters. The metering methods in use have been the subject of intensive study with the result that the input and output totals of the whole line check regularly to less than 1,000 bbl. difference within each month. This difference is easily accounted for by temperature changes. It is interesting to note that tank gages are used only for stock position reports—entire dependence being placed on meters when products are moved in and out of the line.

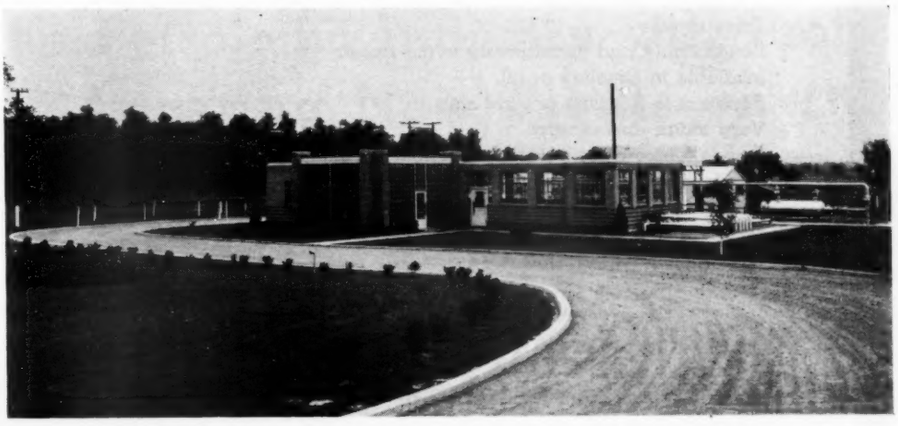
At takeoff points, automatic pressure-reducing valves are used to bring the stream down to low pressure, and also to permit accurate control of the rate of takeoff. These valves assure accuracy of rate by maintaining a constant upstream pressure against the meter and the withdrawal valve. They also guard against excessive pressure in case of closure of tank or line valve downstream from the meters. Control of rate of withdrawal is usually so close that the rate changes only with minor errors of time of meter reading and is usually in the order of less than 5 bbl. per hour.

Products are dispatched and the line is supervised from the central dispatching office at company headquarters. Communication between the

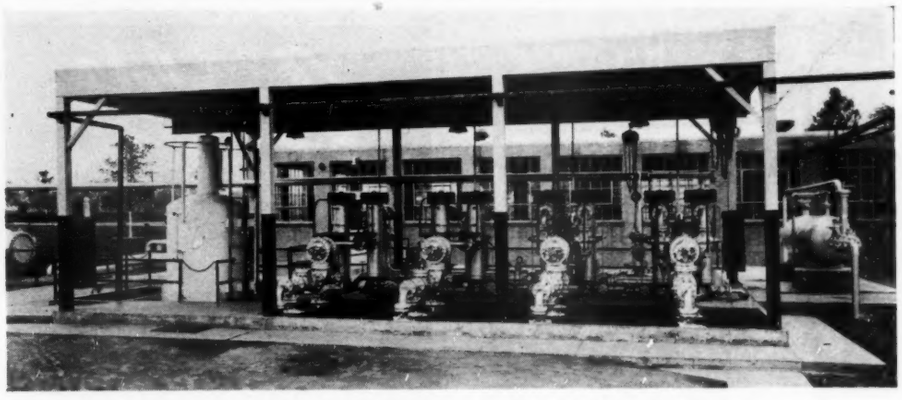
(Continued on Page 147)



Pumping station at Vandalia, Ill., showing filter equipment and manifold



Main building including pump station and office at the Lima, Ohio, terminal



Metering equipment at the Lima terminal (above), the terminus for the 8-in. line and origin of the 6-in. line. Below: Storage and tank-truck loading rack at the Columbus terminal

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Pipe-Line Practices

By L. D. SUGG
Magnolia Airco Gas Products Co.

FEW industries have made as radical changes in construction methods as have the pipe lines (both oil and gas) in the last few years.

Under the old methods, there were three welding gangs in one crew. There was a line-up crew with from one to three operators tack-welding the individual joints together in sections of 50 to 300 ft., dependent upon the terrain. This was necessary in order to give the proper length sections to make the bends to fit the contour of the trench. This crew was followed by the roll welders, who made the welds in the various sections. The welds on these sections were made by rolling or turning these long sections as the weld progressed around the pipe. Quite often more than one operator welded on a section at the same time, which was extremely wasteful as the speed of welding on such a section was determined by the slowest operator. Next in line came the tie-in crew with two or more operators who "bell-holed" or made position welds where these sections were welded together.

These methods were costly and cumbersome and is was apparent that a change had to be made. These changes, once they were started, took place quite rapidly. Like a great many other changes in industry, the idea of new methods was conceived at about the same time by several construction men, and various changes were made in the personnel of the crews and the general scheme until an entirely new method evolved.

This new and streamlined method, commonly known as stovepiping, has greatly reduced the personnel and the number of pieces of equipment involved and has speeded up production. By the stovepipe method, the tie-in crew and the roll-weld crew have been eliminated entirely. The pipe is placed in position by the line-up crew and

A 10-in. oil line welded by the stovepipe method. Note the absence of heavy equipment

Welding Advance

tack-welded into one continuous line, followed closely by the main welding crew who make all welds by the bell-hole or position method, thereby eliminating long moves ahead with equipment and a corresponding loss in the operators' actual welding time. Where it is necessary to bend the pipe to fit the trench, completed welds are made by the operator who tack-welds for the line-up crew, and the pipe is bent by the line-up crew as they progress along the right-of-way, eliminating the tie-in crew and concentrating the work where it is more easily supervised.

Now that we have seen the changes in general, let's take a look at the actual welding procedure in particular.

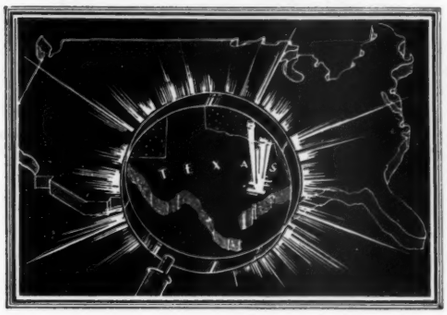
In the oxyacetylene method, gone are the great mountains of deposited metal used in the old ripple-weld method which were necessary to secure maximum strength. This has been replaced by the new back-hand methods known as Aircoweld and Lindeweld. In these methods, a special alloyed welding rod is deposited by the operator using a carburizing flame; that is, with a slight tail or feather of acetylene which prevents the weld metal from oxidizing, thereby assuring a strong ductile weld in half the time with half the material previously used.

Electric-Arc Process

In the electric-arc process, improvement in electrodes has resulted in elimination of the bell-and-spigot joint, the double-bell joint with a sleeve, and all similar type of joints. Plain-end pipe is now welded with the arc without fear of pin holes or cracked welds and with a speed comparable to the other types of joints. These welds are made by the multipass method; that is, several individual beads are deposited to make a complete weld. Beginning with the first, or stringer bead, all slag is carefully removed with a chipping hammer and wire brush to prevent inclusion in the subsequent beads. The number of beads deposited is dependent entirely upon the wall thickness of the pipe itself. The weld or deposited metal in the area on the side of the pipe from 2 or 3 in. above the center line to a distance 2 or 3 in. below the center line is the hardest to make and often forms a slight V or depression in the weld at this point. Quite often an additional bead is deposited in this area to bring the weld up to proper size before the last, or finishing, bead is applied.

Until the last few months all welds had been made by starting at the top center and progressing down to the bottom center of the pipe with as little weaving as possible. The amount of metal deposited in this manner is limited but insures good penetration. This method is still used on all beads except the last, or finishing, bead, which is now applied by starting at the bottom center and using the weaving method, working up to the top center on one side; then the process is repeated on the opposite side to complete the weld. This does two things—it allows the operator to build up any slight depressions or valleys in the weld proper and it produces a finish bead of much better appearance.

While these changes have gone far toward increasing the efficiency of pipe-line welding, the future will no doubt show improvements in technique that are as great or even greater than those of the past.



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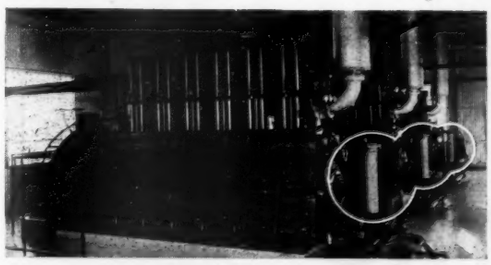
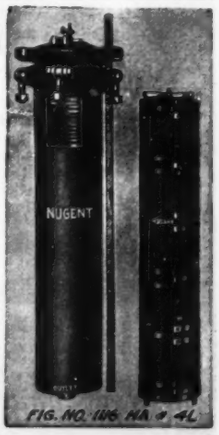


PROTECTED BY NUGENT

The three Worthington CG5 Engines shown at the left are all protected by Nugent Filters of the type shown at the right. These engines are installed in a Tulsa, Okla., refinery.



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ONE BIG reason for the widespread use of Nugent Oil Filters on engines of all sizes is that they are EASY TO APPLY. No complicated pipe connections . . . No redesigning of the lubricating system to allow for filtering equipment . . . a minimum of auxiliary fittings. *Nugent Filters have 20 times more actual filtering area than most filters of comparable size.* Write for quotations today. WM. W. NUGENT & CO., INC., 408 N. Hermitage Ave., Chicago, Ill. *Est. 1897.*

Pipe-Line Truck Has Many Uses In Construction And Maintenance

By JOE B. TIMS

Pipe-Line Superintendent, Lion Oil Refining Co.
El Dorado, Ark.

THE gang truck, shown in the illustration, was used in laying 26 miles of 6-in. welded line. All of the bends were made with the winch and gin pole ahead of the electric-welding crew. The driver and only one man were required for this job. Pipe was laid at the rate of 1½ miles per day across South Arkansas hills and creeks from El Dorado to the Magnolia, Arkansas, field.

Tool boxes are so arranged that all tools are inside the boxes but easily accessible, and the boxes serve as seats for the men. Plywood top and canvas curtains, enable the men to ride to and from the job comfortably and safely.

The threading device, powered from the winch with universal-joint attachment, makes it possible for the driver and one helper to set up and finish a 6-in. thread in 3 minutes, whereas the old way of threading by hand required four men at least ½ hour. The 4 by 5 pump, driven from winch sprocket, is used to pump out bell holes and to pick up waste oil; a pressure gage is mounted on the dash of truck cab so that the driver can easily see the gage.

The acetylene welding equipment is on the rack and extra tips, etc., are in tool boxes.

The truck was equipped by the foreman and men who have worked 3 years without a lost-time accident with a gang of from 10 to 125 men.

The men shown in the picture are L. M. Speer, connection foreman; E. H. Lindsey, gang pusher, and J. B. Tims, pipe-line superintendent, all of Lion Oil Refining Co.

•

Construction and Testing of Lines for High-Pressure Operation in Texas

By R. VANDERCOOK

Pipe-Line Superintendent, Lone Star Gas Co.

IN undertaking the construction of gathering and injection lines for the new recycling plant at Grapeland, Tex., the construction department of Lone Star Gas Co. was faced with requirements which were different from those handled previously in building high-pressure lines for the company which, altogether, represented a considerable mileage.

After the outside-diameter sizes and working pressures had been specified by the engineering department, the purchasing department determined the wall thicknesses. Pipe was furnished for the project with a safety factor of 4, as follows:

4,002 ft. of 8-in., wall thickness 0.750 in.
10,335 ft. of 8-in., wall thickness 0.6875 in.
2,085 ft. of 6-in., wall thickness 0.500 in.
10,383 ft. of 3-in., wall thickness 0.254 in.

All pipe was delivered with 30° beveled ends for

(Continued on Page 142)

The Powell Line is COMPLETE

• • • FOR EVERY SERVICE IN THE PETROLEUM AND OIL REFINING INDUSTRY

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HERE'S A VALVE THAT BRINGS POWELL QUALITY TO ANY Pipeline INSTALLATION

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Offering the same advantages characteristic of all Powell iron body, bronze mounted valves . . . . namely, greater strength and soundness of castings . . . . this particula valve has the distinguishing feature of a double spreading mechanism, which exerts equal pressure on both disc faces. Provision is also made to minimize friction between seat and discs . . . . thus, not only assuring the tightest of fits when valve is closed, but easy opening at all times. A vrable either with rising or non-rising stems . . both in a wide range of sizes and pressures.

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FERTILE SEED

When Frick-Reid builds a pipe line, it may well be the connecting link between oil discovered and produced with Frick-Reid equipment, and oil refined in a plant designed, engineered and erected through Frick-Reid facilities.

Running through the history of oil for more years than many successful operators can remember are the sinews of Frick-Reid service to the driller, the producer, the pipe liner and the refiner.

To describe the Frick-Reid way of doing business would be like trying to describe an old friendship. Oil men like it, and that's sufficient. Early Frick-Reid plans were virile seed in fertile soil, and the fruits are now an abundance of helpful, timely, responsible service in old and new fields everywhere east of the Rockies.

J&L PIPE

There is no substitute for the efficiency, safety and satisfaction of pipe line systems engineered by Frick-Reid and laid with JONES & LAUGHLIN pipe.

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Stationary type machine cleaning pipe and applying NO-OX-ID and NO-OX-IDized Wrapper

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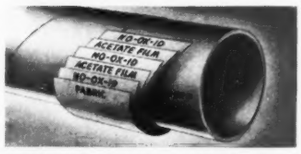
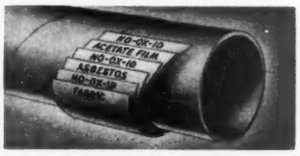
No. 4—NO-OX-IDized Reinforced Fabric Wrapper provides the utmost flexibility.



FOR HAND OR MACHINE APPLICATION
No. 5—NO-OX-IDized Dielectric Wrapper provides the utmost dielectric strength.



FOR MACHINE APPLICATION
No. 7—NO-OX-IDized Reinforced Asbestos Wrapper provides high dielectric strength plus excellent shielding.

The one sure way of protecting your underground pipe lines is to prevent all corrosive agents from coming in contact with the metal. And to do this you have to "waterproof your pipe."

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welding requirements. Weight per foot in the pipe furnished was as follows:

8-in. 63.08 and 58.28 lb.; 6-in. 32.71 lb.; 3-in. 8.80 lb.

Every precaution was taken in order to get welders who were best qualified for this kind of work. Each one was required to pass the A.S.M.E. and A.P.I. welding tests and each welder who passed tests successfully was impressed with the fact that speed records were not wanted.

Seven electric welding machines of 200-amp. rating were used, one for tacking and six for welding. In aligning the pipe for welding according to the usual stovepipe method, lineup clamps were employed. The spacing was an unvarying 1/32 in. In running the stringer beads, a ⅛-in. rod was used; finishing of the welds was done with a 5/32-in. rod. All welding rods were coated.

In welding the 8-in. pipe, seven to eight beads were run; the first bead was run downward; the following five to six beads were run upward. The 6-in. required one bead down and four to five up. The 3-in. required one bead down and three beads up.

As a precautionary measure, all the 6 and 8-in. welds were stress-relieved by heating the pipe to a dull cherry red for a distance of 5-in. each way from the welds. The necessity for this treatment is a subject of controversy, but those directing the company's pipe-line construction work are inclined to endorse it as a practice.

Solid Welding Prescribed

Solid welding was prescribed all the way through to the well. In the gathering lines, 45° lateral connections were employed. Expansion-type loops of the "U" type form the junctions between gathering lines and well lines.

They are also used between wells and meter runs. The meter runs are made of 4-in. pipe weighing 14.89 lb. per ft. with a wall thickness of 0.337 in. Incidentally, mention should be made of the fact that flanges in the meter runs were set in a vertical position to provide for drainage of distillate.

No unusual right-of-way difficulties were encountered. On the whole, average field welding conditions prevailed. Under normal conditions, six or eight bends were made to the mile. Cold bends were made in the usual manner. Work was completed according to schedule.

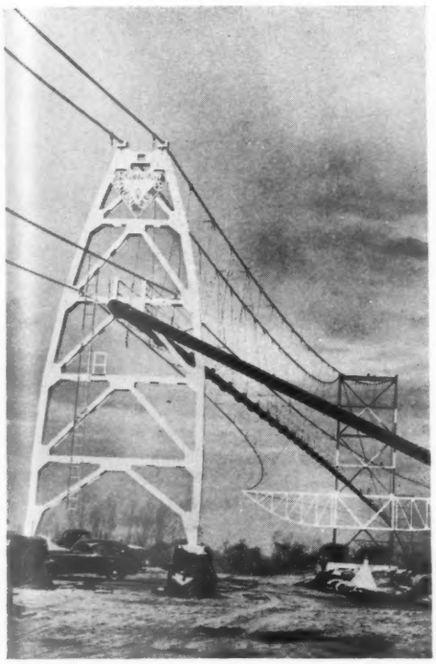
The gathering system was tested first with a hydrostatic pressure of 300 lb. which was applied by a water pump at the plant. After switching to the oil pump, the pressure went up to 2,550 lb., which was sufficient for the gathering system. Close inspection disclosed only two leaks, both of which were in the flange connection of the valves. These were easily stopped by tightening the bolts.

The testing of the injection lines was started in the same way as the test of the gathering system; the line was filled with water and a pressure of 300 lb. was applied. From that point the test was taken over by a concern that specializes in high-pressure hydrostatic tests. With the powerful equipment employed, the pressure was increased to 4,500 lb.

The effect of this high-pressure test on the men who were watching may be described as follows: During the course of this test a remarkable demonstration of reflex phenomena was observed. The needle of the pressure gage seemed to affect the muscles of the necks of the watchers. And, as the needle went up, the muscles of the neck contracted until the needle reached the predetermined 4,500 lb. At that point in the test there was a definite turtleish aspect of the watchers generally. When an inspection of the system under this high pressure showed that there was not a single leak in any of the lines, this tension of the neck muscles slowly diffused through the shoulders as swagger

Large Pipe-Line Suspension Bridge Is Constructed by Northern Natural

By T. P. SANDERS



View of one of the rest towers. These are located 660 ft. back of the main towers

NEAR Sioux City, Iowa, completion of the world's longest single-span pipe-line suspension bridge has marked the establishment of another record by the pipe-line industry for the year 1940. While the record itself is only of academic interest, the design and construction prove that great strides have been made in this phase of pipe-line work so that the new bridge appears to represent perfection. Crossing the navigable Missouri at a height of 54 ft. above high-water level, the bridge has a total depth of 3,540 ft., with the main channel span 1,320 ft. long.

The bridge was constructed to carry Northern Natural Gas Co.'s 16-in. gas transmission line across the Missouri from Nebraska to Iowa as the first step in extending the line from South Sioux City, Neb., to Minneapolis, Minn. The chief reason for selecting a suspension bridge in preference to a submerged river crossing lay in the fact that possibilities of service interruption could be practically eliminated. In supplying a city the size of Minneapolis with gas to be used for all purposes, service interruptions could not be tolerated. Since the Missouri current is fairly swift, with both ice and spring floods to consider, it could not be assured that a line buried in the river bed would remain undisturbed.

Pipe lines crossing large sandy rivers are often parted because of shifting of sand on the river bottom and on the banks. If permanence is to be assured it is necessary to lay the pipe in the bed rock below the water-washed material, and the cost of the dredging and trenching needed to accomplish this is often prohibitive. On rivers classed as navigable, government regulations call for laying lines a minimum depth of 4 to 12 ft. below the river bed, depending on local conditions. Usually, however, the government requirements are satisfied easier than the physical requirements. Such was the case south of Sioux City, where assurance against interruption justified the expense incurred in building the suspension bridge.

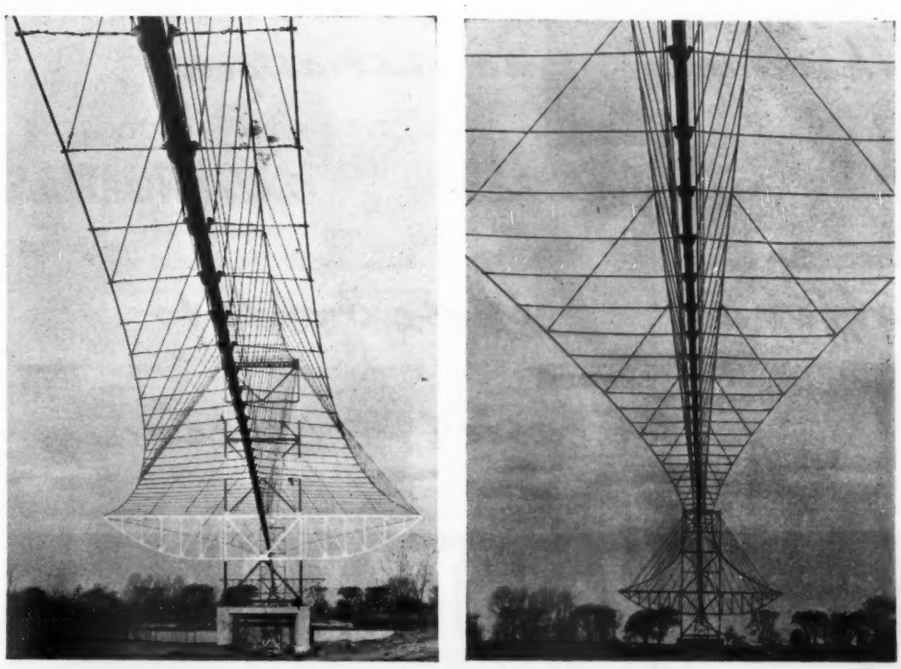
Cable System

The structure consists essentially of two main towers placed on opposite sides of the river, 1,320 ft. apart, two rest towers placed one on each side of the river at a distance of 660 ft. behind the main towers and two end anchors placed approximately 450 ft. back of the rest towers. On this structure rests the cable system for suspending the pipe line and also the wind and sway-cable system for protecting the line against wind loads.

In preparation for construction test holes were bored with a core drill to a depth of 135 ft. at the location of each main tower in order to determine the bearing requirements for the towers. From data obtained in this way, the tower foundations were designed. Each of these consists of two steel caissons 13 ft. in diameter and 84 ft. deep. They extend 82 ft. below the normal ground level and are located on 36-ft. centers. Resting upon these caissons are the concrete pier tops, which are 17 ft. high. The steel structures of the main towers are 115 ft. high and the wind arms have a spread of 156 ft.

The 50-ft. rest towers are founded on concrete piers which in turn rest on steel-bearing piles. The concrete end anchors are 40 ft. long and 16 ft. deep, and are founded on steel-sheet piles that are electrically welded to steel cross members imbedded in the concrete.

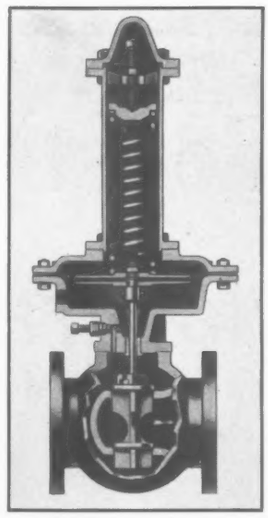
The two main cables extending from the anchors over the tops of the towers are each made up of seven 1⅛-in. galvanized bridge strands which are served together with No. 10 galvanized wire. Attached to these cables are the smaller cables of the pipe-suspension system, and these



Left: Main span, 1,320 ft. long, holding pipe line 54 ft. above high-water level. Wind arms of the main towers have a span of 156 ft. Right: View showing wind-cable system and one of the 134-ft. main towers. (Pictures courtesy of "The Crosby Clipper," published by American Hoist & Derrick Co.)

FIELD REGULATORS FOR GAS GATHERING SYSTEMS

If You Prefer a Spring-loaded Valve—



THIS is Davis' new compact spring-loaded valve, No. 331 S, for back pressure or vacuum service. It is ideal for remote outdoor locations because it is completely weatherproof and the spring cap can be readily sealed to prevent unauthorized resetting. Valves are regularly equipped with double spring—the heavier one being removed when the pressure is near atmosphere. Changing the spring loading from vacuum to back pressure, or vice versa, can be easily done in the field.

From the diaphragm down, the No. 331 S is similar in construction to the well-known Davis No. 330 W counter-weight-loaded regulator. Valve stem and bushing are stainless steel. No brass or bronze is used in any of the construction. Renewable seat rings are included when valves are ordered with KA-2 trim. Built-in bypass (for throttling flow to diaphragm chamber) steadies the valve action and prevents vibration under severe operating conditions.

For complete information about the Davis line of gas regulating valves get our Bulletin G 1.

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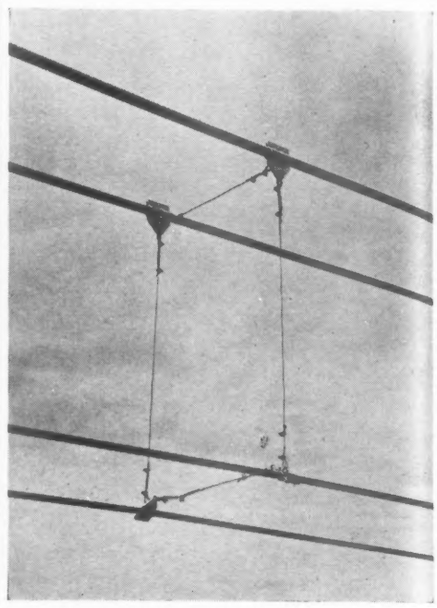
support the pipe by means of cradles.

Lateral support against wind is furnished by two 2¼-in. cables which are attached to the ends of the long wind arms on the main suspension towers. Horizontal members connect the pipe cradles to these wind arms, and another system of cables supports the wind cables from the main suspension cables.

Construction of the bridge was started September 19, 1939. The most time-consuming part of the construction was in the installation of the four caissons. The 13-ft. caissons were assembled at the site. Workers entered the cylinders by means of air chambers with pressures as high as 15 lb. Excavation was by means of hydraulic excavators, or "sand hogs," and as the sand and gravel was washed from beneath, the caissons sunk into place. The cylinders were then concrete filled.

All structural steel work was fabricated at the contractor's plant at Des Moines, Iowa. The steel-and-cable structure was completed before the pipe was placed. For assembling the pipe a platform was built in back of each of the main towers.



Main suspension cables and wind cables near the point where they converge at end anchors

To these platforms the 16-in. pipe was hoisted one joint at a time. As the joints were welded to the main stem, the assembled line was pushed out onto the structure through the use of a winch line while the weight of the line was supported by wire ropes from the towers and main suspension cables. After the assembled lines were run out from both ends, a small platform was hoisted in the center of the bridge so that the two portions could be welded together.

The bridge was designed by Matthews & Kenan of San Antonio, Tex., while the construction contract, including laying of the line across the bridge, was let to Pittsburgh-Des Moines Steel Co. of Des Moines, Iowa. Construction work was under the direction of Gordon R. Lunt, manager of the bridge department for the contractors. J. V. Blake was construction engineer; D. W. Hedrick was superintendent of caisson work; L. H. Heidbreder supervised erection of the steel structure, cable system and the pipe assembling; while Northern Natural Gas Co. was represented by Ross N. Cox, field engineer.

Construction was completed on February 4, 1940, after an elapsed time of 135 work days. The work which took place after December 23 was accompanied by extremely cold weather with temperature as much as 22° below zero. The weather retarded progress considerably and made the cable work and pipe laying particularly unpleasant.

Precision Methods in Pipe-Line Operation

(Continued from Page 135)

dispatching office and all stations, and between stations, is maintained by leased wire commercial teletype.

Pride of the dispatching staff is the "board" which presents an accurate visual picture of what is happening along the whole length of the line. This is shown in an accompanying illustration. Its operation is quite simple. The stream in the line is represented on the "board" by tape. This is laid off to scale 100 bbl. to ⅛ in. and the divisions shown represent 100 and 1,000 bbl. The tape is especially printed on a good grade of bond paper with the limits of accuracy guaranteed to 0.05 of 1 per cent. Controlled temperature and humidity in the room prevent paper stretch or shrinkage.

As hourly reports of inputs into the line are received from the Wood River refinery, tape corresponding in length to the measured volume is fed manually through the Wood River clamp on the "board," and the whole length of tape moves accordingly. To allow for variations of temperature in the line itself from the normal of 60°, the blocks which represent the line are adjusted so that the line length on the "board" is increased with temperature drop below 60° and decreased with temperature raise above that figure. Thus the tape moves along the board in exactly the same manner as does the stream in the actual line.

Five or six grades of gasoline, kerosene, gas oil, diesel fuel, and other tenders of special products are moved through the line. These are represented on the tape by various colors of border printing. When it is realized that the capacity of the line from Wood River to Lima is about 115,000 bbl., and that as many as 17 tenders may be in the line at any given time, the advantages of such a pictorial record can be easily imagined.

One of the main problems of the "all products" line is the removal of the last remaining portions of a particular tender from the line with the minimum of contamination with the tender immediately following. A "cutting" technique has been carefully worked out and standardized on the Shell line to surmount this obstacle. A record of the passage of the particular tender head through previous upstream stations is maintained in the central dispatching office. This record is plotted as a curve of gravity or purity of product against barrels passing the particular station. From this curve it is possible to estimate within extremely close limits the amount of contamination which will go into a tank when cuts are made at a definite gravity point in the stream.

Keeping these amounts of contamination within carefully regulated limits, the dispatching office will then designate that a particular cut be made at a certain gravity. Instructions to this effect are wired to the takeoff point which are followed exactly as given. For the purpose of making these cuts the gravity reading is taken from the recording gravitometer or from samples taken at two-minute intervals and read by hydrometer.

In keeping with its modern facilities, the Shell gasoline line is patrolled by airplane on regular weekly schedules. Leaks and signs of tampering are easily spotted by this method and repair crews are brought quickly to the spot. When a leak is discovered or any other emergency arises in a particular section of line, that section may be cut off from the main stream. This is accomplished by block valves located approximately 10 miles apart throughout the length of the line. As the plane flies over each station, the attendant reports it by telephone to the dispatcher and relays instructions to the pilot through ground signals. Convenient landing fields have been laid out along the line for emergency landings.

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YOU will see a stainless steel and monel movement that will stand up under any condition of temperature, pressure or pulsation. You will see a bourdon tube turned from solid bar stock, bored, reamed and ground to microscopic limits. Such a gauge *stays* accurate. But if by any chance it is knocked out of adjustment the Marsh "Recalibrator" provides a means of quickly correcting it throughout its *entire scale*.

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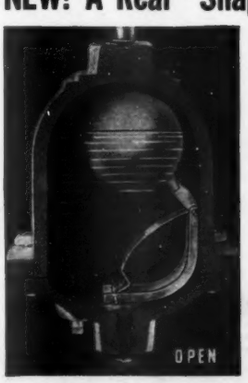

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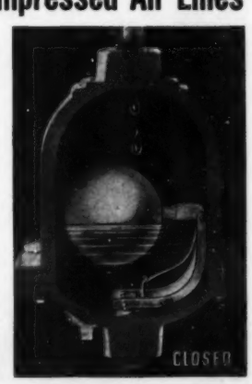

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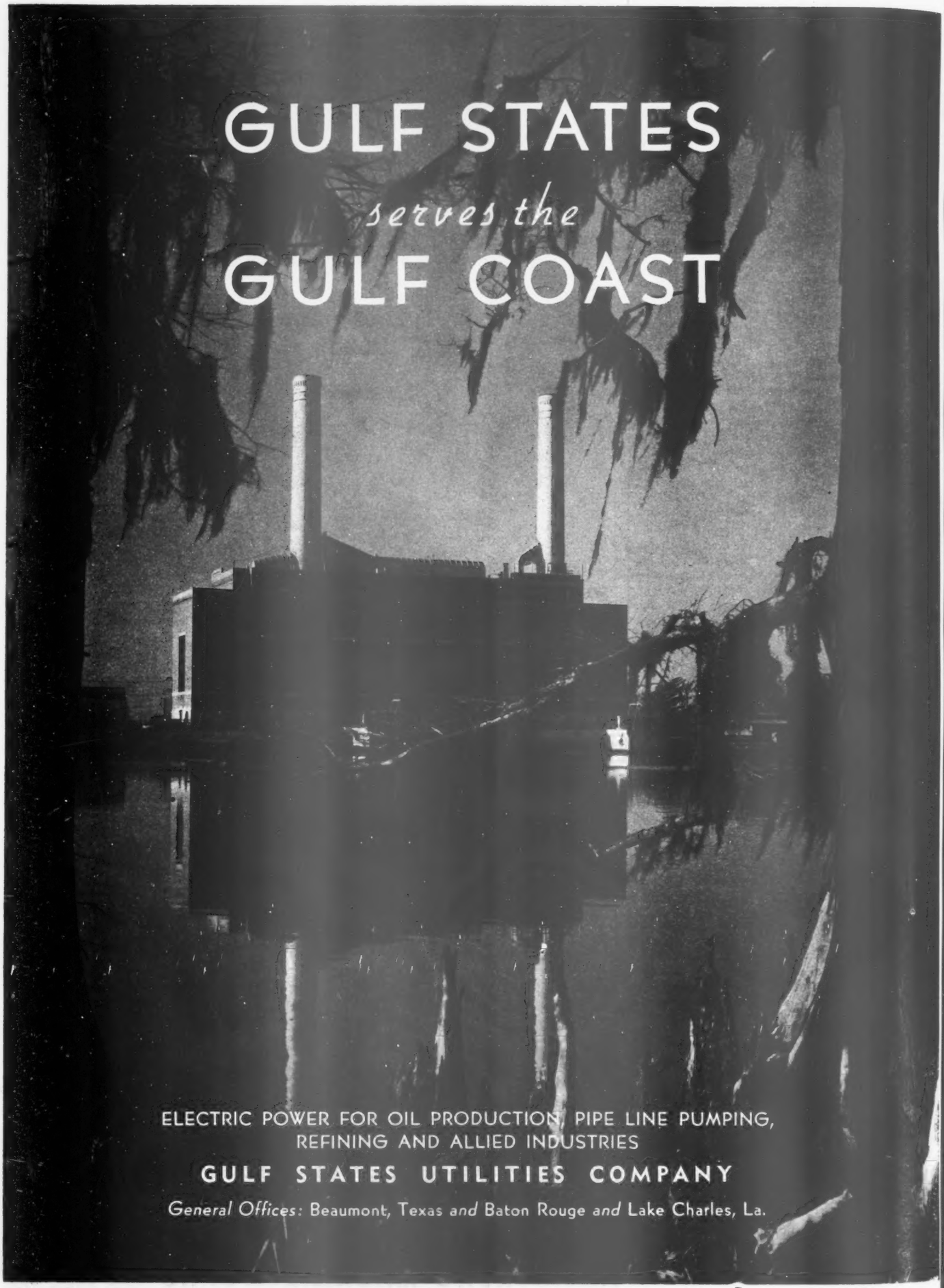
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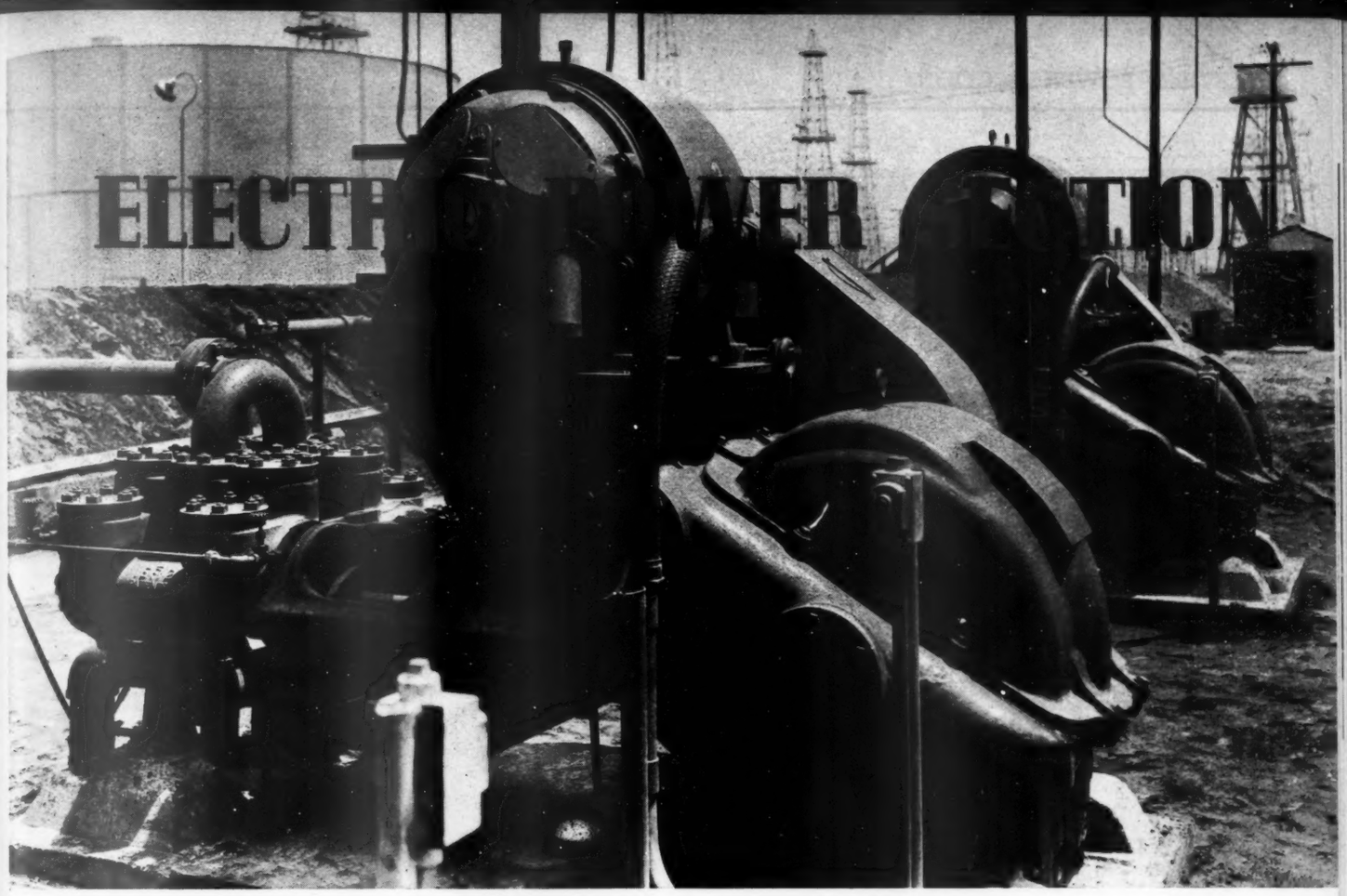


Electric motor-driven reciprocating pumps operated in connection with the gathering system of General Petroleum Co., Wilmington, Calif.

Fifteen Years of Electric Pipe-Line Pumping

By W. H. STUEVE
Oklahoma Gas & Electric Co., Oklahoma City, Okla.

WITHIN the past 15 years the pipe-line industry has installed 211,575 hp. of electric motors for prime movers in pump stations for trunk-line oil and gasoline transportation. During the first 6-year period, from 1925 to 1931, almost 166,000 hp. in electric motors was installed for various kinds of service. The period represented a wide expansion of facilities to serve new oil fields discovered and for the transportation of gasoline from refining centers to population centers. In the succeeding 9 years from 1931 to date, the principal investments in pipe line provided a wider expansion of gasoline transportation facilities. There are today almost 8,000 miles of trunk-line pipe lines installed to deliver gasoline from refining centers to population centers, and the pump stations are equipped with 25,775 hp. of electric motors of different types.

A great many reasons can be assigned as to the important elements of economy which determined the selection of electric motors as prime movers in these pump stations, which are enumerated and discussed below.

Of primary importance, the first cost of the electric pump station is perhaps only 35 to 45 per cent of the investment necessary when other forms of prime movers are contemplated. This lower first cost is brought about by the use of the highly efficient centrifugal pump coupled direct to the two-pole 3,600-r.p.m. induction motor, tending to lower the size and cost of the building, making fewer number of attendants required, which in turn lower the fixed charges and operating labor costs.

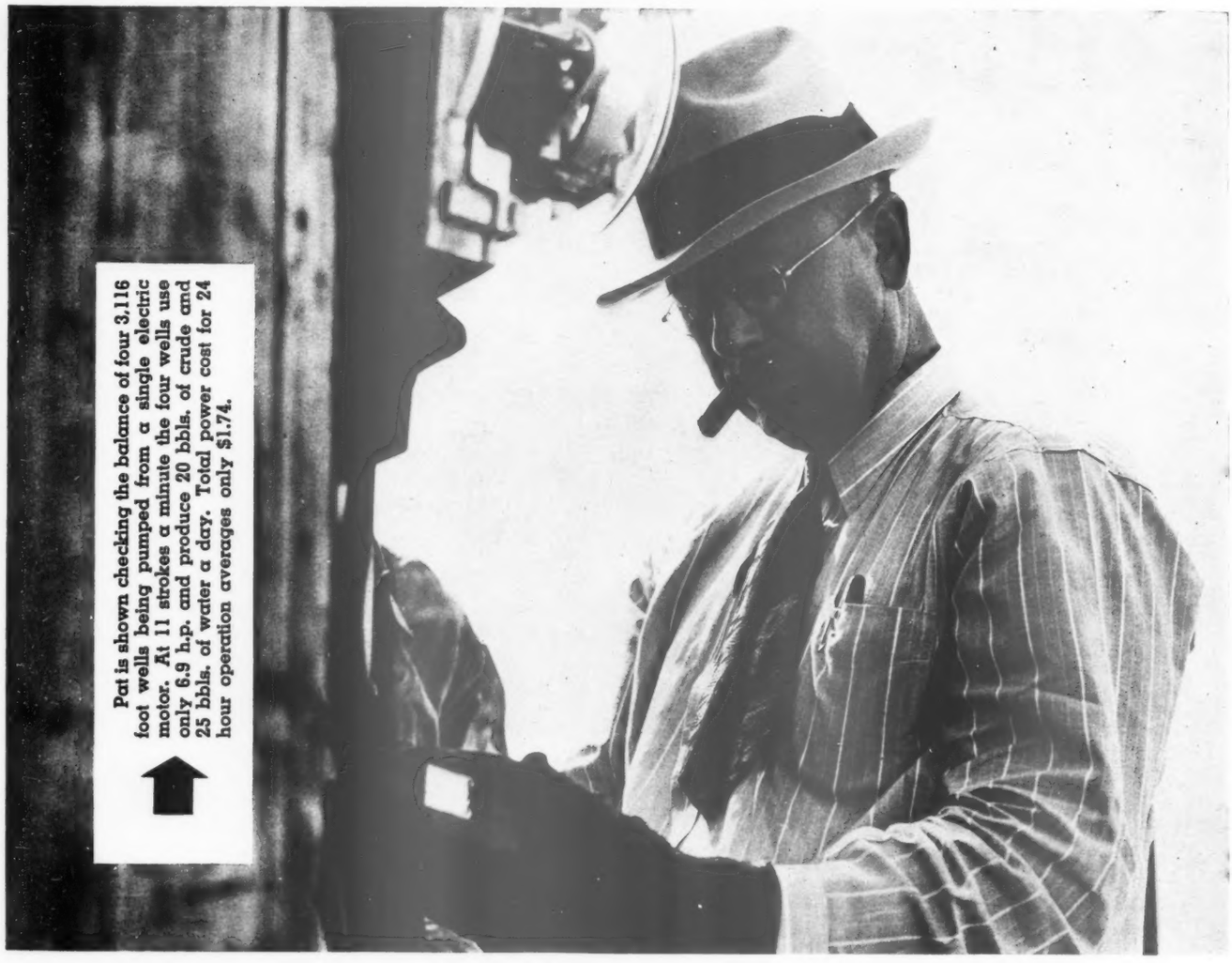
Another factor which tends to make the electric motor economically attractive to the operator is the almost utter lack of maintenance expense, for it has been found after extensive surveys that repairs are negligible outside of a small amount of routine work.

Some operators of great numbers of electric motors report that proper maintenance charges should not exceed 20 cents per horsepower per year, and others report their maintenance costs are never in excess of 5 cents per horsepower per year for all purposes.

With electric motors, lubrication represents an almost negligible cost. Cooling and circulating water problems entirely disappear from consideration when electric motors are installed. In the case of considering liquid fuels for internal-combustion engines, investment in storage facilities are necessary at each pump station. Also the liquid fuel occupies a certain space in the line which could be used otherwise for revenue production, and in addition, the liquid fuel so pumped should bear its own cost of pumping.

These operating items mentioned previously, fixed charges, labor, maintenance, fuel and lubrication all put together make up the principal costs of running a pump station. The electric utilities have as their satisfied customers buying electric power to some extent for pump stations all the 20 major oil companies and most of the smaller oil companies. It can, therefore, be truthfully said that utility electric power has its place in the economic picture for the transportation of crude oil and gasoline, provided, of course, that the various operating costs are given proper consideration in making the comparative analyses.

In summing up the overall advantages or disadvantages of utility electric power for pipe-line pumping-station operation, it is important that proper consideration be given primarily to the duty expected of the proposed station or stations



Pat is shown checking the balance of four 3,116 foot wells being pumped from a single electric motor. At 11 strokes a minute the four wells use only 6.9 h.p. and produce 20 bbls. of crude and 25 bbls. of water a day. Total power cost for 24 hour operation averages only $1.74.

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over a long period of time projected into the future.

It is not sufficient merely to make an analysis of the proposed duty of the station for 1 year assuming then that the maximum output of the station is to be continued year after year for history, which is the best teacher, tells us that this is not true.

In order that we may know what to expect in the future, let us take a look at the operating record of five pump stations originally installed in the Oklahoma City oil field in 1929 and see how nearly they operated under maximum load during the next 10 years to and including 1939. The five stations were selected as being typical of a vast number of pump-station installations and represented a total of 3,200 hp. of electric motors which were capable of pumping away 164,000 bbl. per day, and at that time represented about three-fourths of the total producing capacity of the field.

These five pump stations actually pumped away 58 per cent of all the oil produced in the Oklahoma City oil field during the 11 years studied and the capacity factor achieved during this period was 47 per cent, and the weighted average utilization of the motor equipment installed was 33 per cent.

These deductions are in keeping with results obtained by a survey of pipe lines in the United States, wherein the capacity factor in an average year was of the order of 45 per cent, which figure is maintained for most of the years studied, and varied between 40 and 50 per cent on a barrel-mile-capacity basis.

A study of Table 1 reveals the consolidated

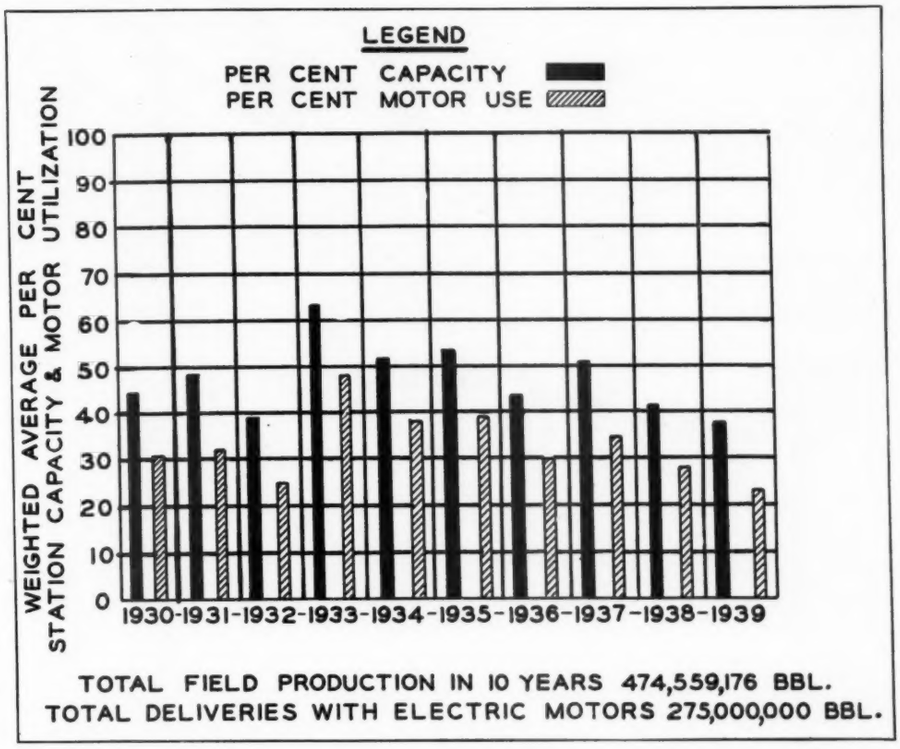
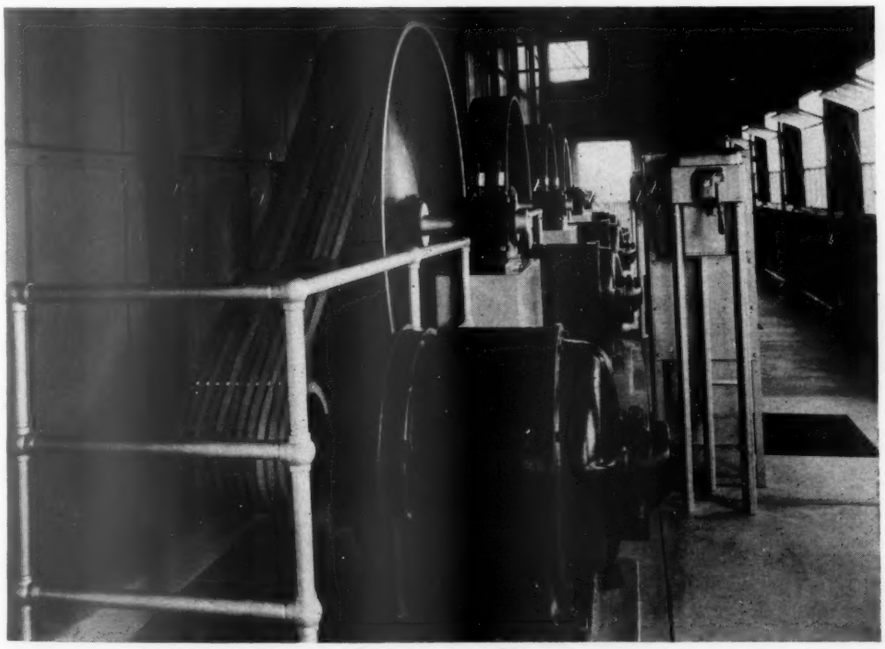


Fig. 1—Relation between 3,200 hp. of motor-pumping equipment utilized and capacity pumped by five stations whose capacity is 164,000 bbl. per day from Oklahoma City oil fields

TABLE 1—ELEVEN YEARS OPERATING RECORD OF FIVE PUMP STATIONS SERVING THE OKLAHOMA CITY OIL FIELD (3,200 HP.—164,000 BBL. PER DAY)

Electric-installed hp.	Barrels per day pumping capacity	Annual average per cent utilization of installed horsepower										
		1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939
200	12,000	3	12	45	20	32	44	40	37	41	15	4
400	22,000	4	42	35	22	54	60	50	40	60	55	60
500	25,000	3	80	58	60	59	60	70	50	80	35	4
900	40,000	10	35	40	30	68	53	64	50	45	52	53
1,200	65,000	3	7	15	8	30	10	3	2	0	0	0
Weighted average utilization of prime-mover equipment		..	31	33	25	48	38	39	30	35	28	24
Pipe-line capacity factor, per cent		..	45	48	39	64	52	54	44	51	42	38



Electric motors at pumping station of Pan American Pipe Line Co., on the Gulf Coast

deliveries of pipe lines from a given oil field follow the general trend of production decline of most oil fields after 10 or 11 years of operation.

It can be noted from Table 1 that while several stations continue to utilize about 60 per cent of the electric equipment (ratio of maximum possible kilowatt-hours to actual kilowatt-hours purchased) in 1939, the other stations have been practically discontinued.

Ordinarily centrifugal pump stations which utilize only one-half their electric motor capacity can deliver 70 per cent of the pipe-line capacity. Fig. 1 illustrates graphically the relation between the motor utilization in per cent of the possible maximum if operating at full load, and the actual oil pumped in terms of per cent of maximum possible capacity. Note the gradual decline in capacity required as the field becomes older, and the consequent smaller need for motor capacity. This situation holds true for practically all producing fields or pump-station deliveries studied.

One may ask what benefit this study of past performance of groups of pump stations as detailed in Table 1 would be to the design engineer. The answer is that the design engineer will expect the new station he contemplates erecting to operate in the future years at the same capacity factor as stations have operated in the past, and accordingly bases his total pumping costs over the future years only after consideration is given to the production decline normally expected and the following facts:

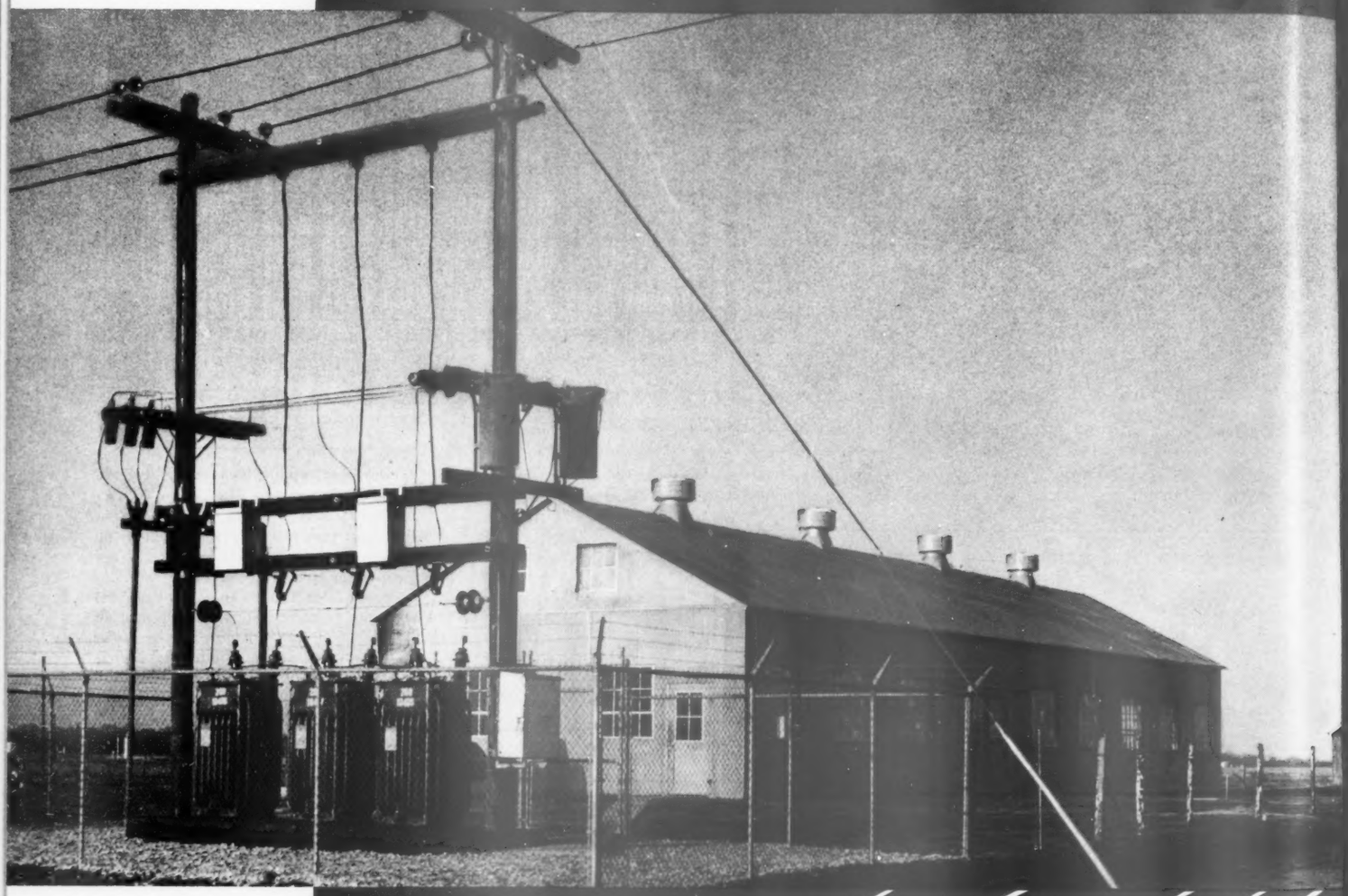
(*a*) The electric-centrifugal station originally will cost only one-half or one-third the cost of any other type of station, therefore, making his fixed charges considerably lower in proportion.

(*b*) The electric-station maintenance costs will amount to only one-twentieth of the cost of any other type of station.

(*c*) The electric station can be made automatic or semiautomatic to such an extent as would permit operation labor costs to be perhaps one-half that of any other type of station.

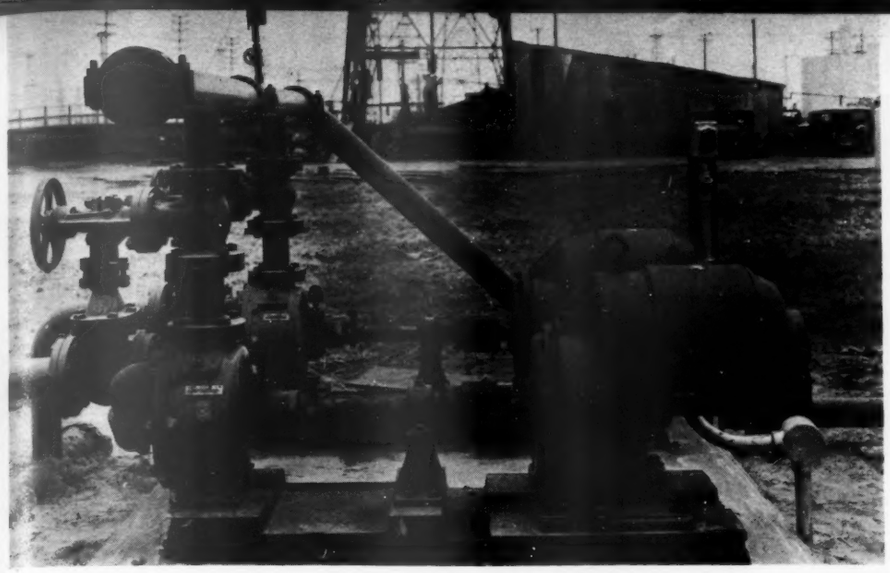
(Continued on Page 155)

Utility



PIPELINE OPERATORS

Remember, statistics reveal that trunk pipelines actually deliver only about 45% of their designed capacity and utilize only 25% of their prime mover capacity in a normal year. By using Purchased Electric Power you pay for only that which you use—no surplus capacity investment required. So why not let your electric power company assume the power investment, thereby effecting economical pumping.



Rotary pumps driven by electric motors on field gathering system of Union Pacific Oil Co., Wilmington, Calif.

ceptance for all classes of service to various branches of the oil industry known as a "general rate," consisting of a primary charge equivalent to a fair return on the power utilities generating plant and line investments after making allowance for some diversity.

The secondary portion of this "general rate" commonly known as the energy clause is calculated to cover generating fuel costs and equivalent operating labor and maintenance of the competitive private generating plant. However, both the pipe-line and general rate schedules have been accepted by the industry and each schedule has proved of economic merit to the pipe-line operator for a long tenure of years. As evidence of the widespread use of utility power for pipe-line operation for long pipe lines completely electrified, a list of transportation companies is submitted in Table 2.

While the list of electric motor-driven pump stations is impressive from the standpoint of the great number of major companies involved,

(*d*) The electric power charges are based on the use made of the power company's facilities from month to month, and that the charges are not based on the pump station's installed-capacity investment.

(*e*) The salvage value of the electric station is a great deal greater in proportion than would obtain with other types of equipment, should it become necessary to remove the station and install elsewhere.

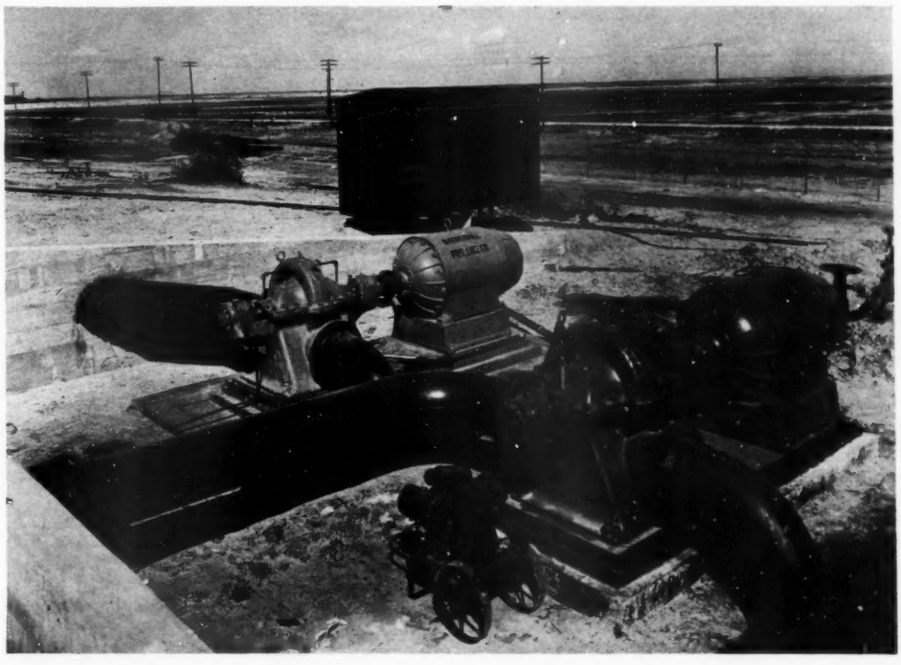
In studying the items which make up the operating costs of pump stations, both engine driven and electric motor operated when operating at near full capacity, it is found in the case of the engine-driven station that the fixed operating costs consisting of interest, depreciation, insurance, taxes, operating labor and maintenance all account for about 75 per cent of the total charges, with fuel and lubrication accounting for only 25 per cent of the total, whereas, in the case of the electric motor-driven station, the exact opposite is true in that the fixed costs enumerated above amount to only 25 per cent of the total operating expense, and the power costs approximate 75 per cent of the total cost.

Assuming that the operating demands on the pump station required that only one-half the equipment was in use for a long period of time, then in the case of engine station the fuel costs would be reduced one-half of 25 per cent resulting in the overall costs approximating 87½ per cent of the full-load value, whereas in the case of the electric station approximately one-half of the power costs of 75 per cent would be saved resulting in the overall costs being reduced to 62½ per cent of the full-load value.

Some electric-power companies have proposed and offered to the pipe-line industry a very equitable-rate schedule designed to meet the stated needs of the operator under all conditions. The rate schedule known as "pipe-line rate" is the exact duplicate of the pipe-line-station operator's costs should he attempt to simulate electric operation with other types of prime movers. The primary charge in this schedule when added to the electric station's inherent operating fixed costs of 25 per cent mentioned above, makes the electric station operating fixed costs equal to those fixed operating costs, including the greater labor and maintenance costs of other types of prime mover operated stations.

This pipe-line-rate schedule for secondary charges assesses a small addition for energy costs (kilowatt-hours) which are based on the prevailing price of crude oil converted to the operator's equivalent production costs.

While this type of schedule is theoretically correct, since it is based on the pipe-line company's saving by the electric-station investment, coupled



Centrifugal pumps driven by electric motors at a station of Barnsdall Pipe Line Co., near Corpus Christi, Tex.

with the lower operating labor and maintenance of the electric station, when it is applied to given conditions of pumping it exactly meets the operator's expectations of comparative costs, it has not met with complete acceptance in the industry because of its inflexibility and distinctiveness in that it can be applied to only this one class of competitive service. A somewhat more satisfactory rate schedule meeting with a greater acceptance for all classes of service to various branches of the oil industry known as a "general rate," consisting of a primary charge equivalent to a fair return on the power utilities generating plant and line investments after making allowance for some diversity.

it must be borne in mind that the list represents only one-half of the total electrified stations in the United States. Some few of the stations listed in Table 2 have been removed, but in the main, they have been reconnected for use elsewhere. In addition to the 211,575 hp. of motors used and installed for trunk-line pumping, a further impressive total of 50,000 hp. is estimated to be in use for gathering-line pump stations.

TABLE 2—SOME OF THE PRINCIPAL ELECTRIFIED PIPE LINES USING UTILITY POWER

				Pipe-line characteristics					
Pipe-line company	Origin	Destination	Product pumped	Length miles	Diameter inches	Capacity B/day	No. stations	Station hp.	Total electric hp.
Atlantic	West Texas	Gulf	Crude	480	10	30,000	8	600	4,800
Illinois	West Texas	Gulf	Crude	400	8	20,000	7	300	2,100
Pure-Van	North Texas	Gulf	Crude	210	10	30,000	6	750	4,500
Shell	West Texas	Oklahoma	Crude	485	10	40,000	14	1,200	16,800
Shell	West Texas	Gulf	Crude	450	10	30,000	9	900	8,100
Shell	East Texas	Gulf	Crude	190	10	30,000	3	600	1,800
Shell	Illinois	Ohio	Gasoline	450	6–8	20,000	4	500	2,000
Tex.-Emp.	Oklahoma	Great Lakes	Crude	12	Booster	*25,000	9	2,400	21,600
Susquehanna	Tidewater	Ohio	Gasoline	450	6–8	25,444	10	500	5,000
Keystone	Tidewater	Ohio-N. Y.	Gasoline	500	6–8	25,000	10	500	5,000
Champlin	Oklahoma	Nebraska	Gasoline	250	6	6,000	2	200	400
Great Lakes	Oklahoma	Great Lakes	Gasoline	Booster	6–8	*14,000	13	400-700	7,300
Magnolia	Texas	Texas	Crude	Booster	...	All	22	...	26,350
Texas	West Texas	Gulf	Crude	450	12	30,000	6	800	4,800
Sun	East Texas	Gulf	Crude	190	10	20,000	5	400	2,000
Total electric horsepower									110,350

*Increased capacity.

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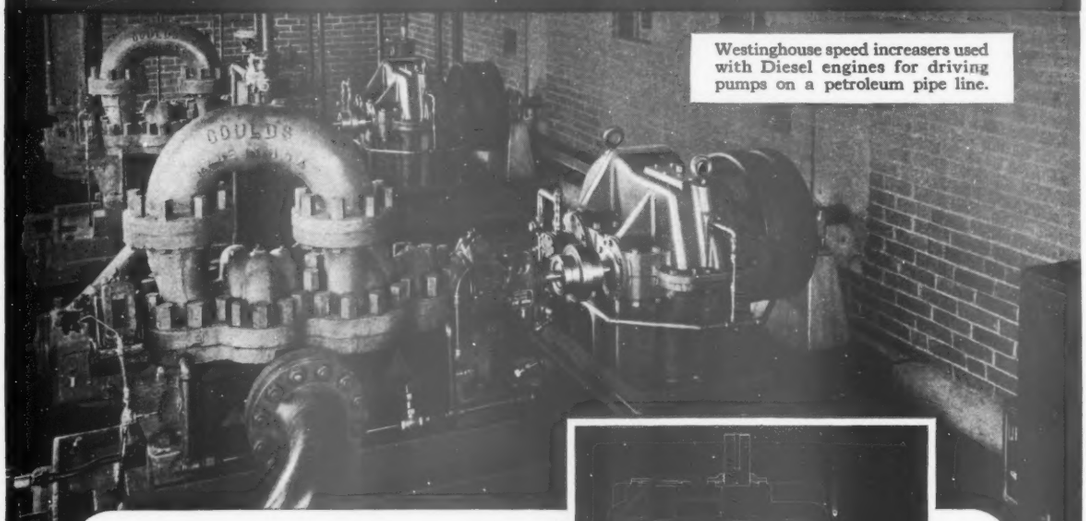
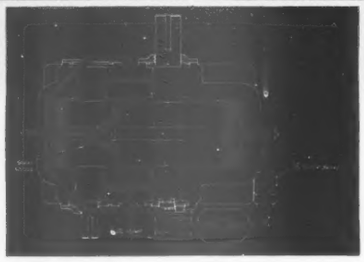


Westinghouse speed increasers used with Diesel engines for driving pumps on a petroleum pipe line.



Side view diagram of SU Speed Increaser showing forced-feed lubrication system with pump, cooler and strainer externally mounted.

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All parts of lubrication system are externally mounted making them easily accessible. An oil strainer keeps grit and dirt out of the lubricant. A specially designed oil cooler dissipates the heat.

The efficient lubrication system of Type SU Gear Units is only one of the reasons why these speed increasers have been so generally adopted by industry for a wide variety of applications.

Designed for service with Diesel engines, electric motors, or gas engines, each Type SU Gear Unit is tailor-made to meet individual requirements, thus assuring maximum performance for every installation. It will pay you to get all the details about Westinghouse Type SU Gear Units before you make your next speed increaser installation. Write for booklet DD-3650.

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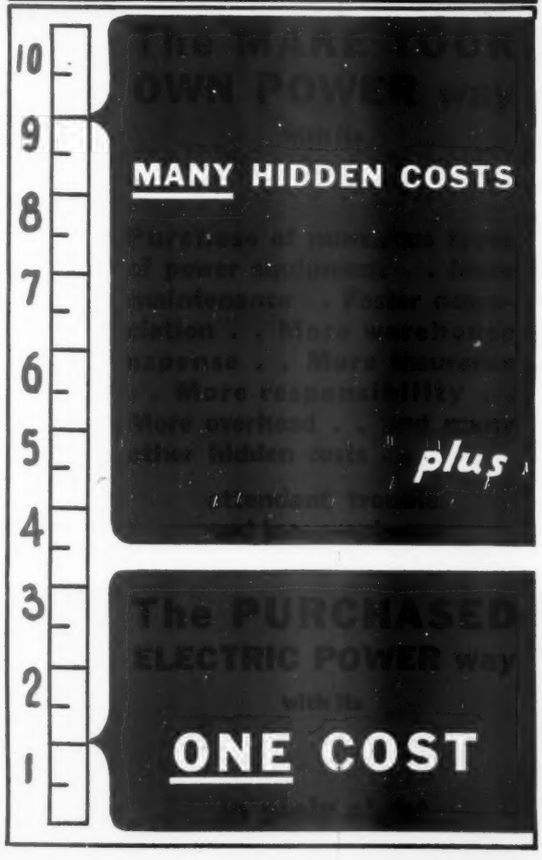

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Automatic Operation for Pipe-Line Pump Stations

By J. M. PEARSON
Susquehanna Pipe Line Co.

THE Susquehanna pipe line was originally designed for manual operations throughout. Its purpose was to deliver finished products to bulk plants for market distribution. The largest portion of the traffic was in gasoline. The pipe line feeds numerous delivery points along its route, each of which requires a small delivery compared with the throughput capacity of the line. However, when making deliveries to many bulk plants rather large variations in the flow rates along the line are encountered. The location of booster stations was made taking due consideration of the throughput requirements as compromised by the local deliveries required en route.

The two engineers' houses, the electric substation and the pump house

Since the chief product handled is gasoline the advantage of straight-through pumping is obvious. There is no storage en route as far as the pipe line is concerned so the evaporation losses are a minimum and the products pumped suffer the minimum change from these losses en route to the market. The disadvantage of straight-through operation is that the operating conditions at any given pump station are subject to wide variations. To meet the requirements of flexibility, centrifugal pumps were installed and the engineers were instructed by pumping orders issued daily as to what they might expect in the operation of their station. In effect it was necessary for a pumping station engineer to maintain a continuous watch on his inlet and outlet pressures and so to adjust his valves as to maintain a positive pressure at the inlet to the pump and to prevent the occurrence of an overpressure at the outlet of the station. Rapid changes due to the shutting off of bulk plants, pumping of sumps, or switching tanks had to be taken care of with considerable manual adjustment of valves from one end of the pipe line to the other.

With the pump stations operating automatically the control equipment takes care of these variations in load as rapidly as they occur and does so without the attention of the engineer. The automatic controls are also capable of starting a station when the load approaches the point at which that station is needed or to shut down the station and bypass at the point where the station is no longer necessary.

The result of applying this automatic operation to the majority of pump stations has been very gratifying. In the first place each station automatically pumps as much gasoline as it can get rid of or as much gasoline as it receives, whichever quantity is smaller. Under these conditions variations in load are immediately taken care of and there is no hazard to the station pumping equipment. The operation of the station requires two men instead of five. The time of these men is spent mostly in station maintenance and the man on duty is on call only if trouble develops. Where houses are customarily built for the use of the employes, automatic operation would require the construction of only two houses instead of several. On the other hand where the employes do not usually live at the station the same two houses would be required in order to have an engineer on call in case of emergency.

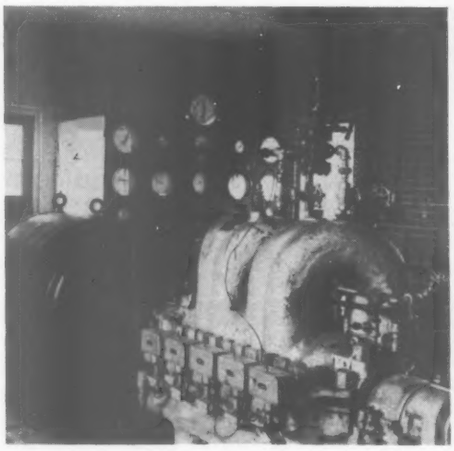
The extra cost of station equipment for a one-pump booster station is between $3,000 and $4,000. The extra maintenance required by automatic equipment is offset by less maintenance required by the pumping equipment. With automatic operation the pipe line as a whole responds smoothly and quickly to changes in demand.

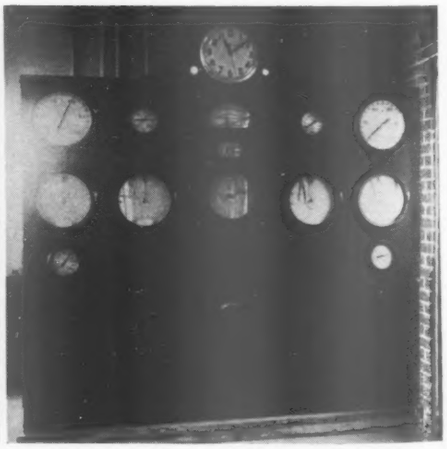
Principles of Operation

1. Whether a station is on the line or bypassing is determined by the flow. The venturi tube in the line provides a differential pressure which operates, through the venturi meter, suitable switch gear to start the station and to stop it at predetermined rates.

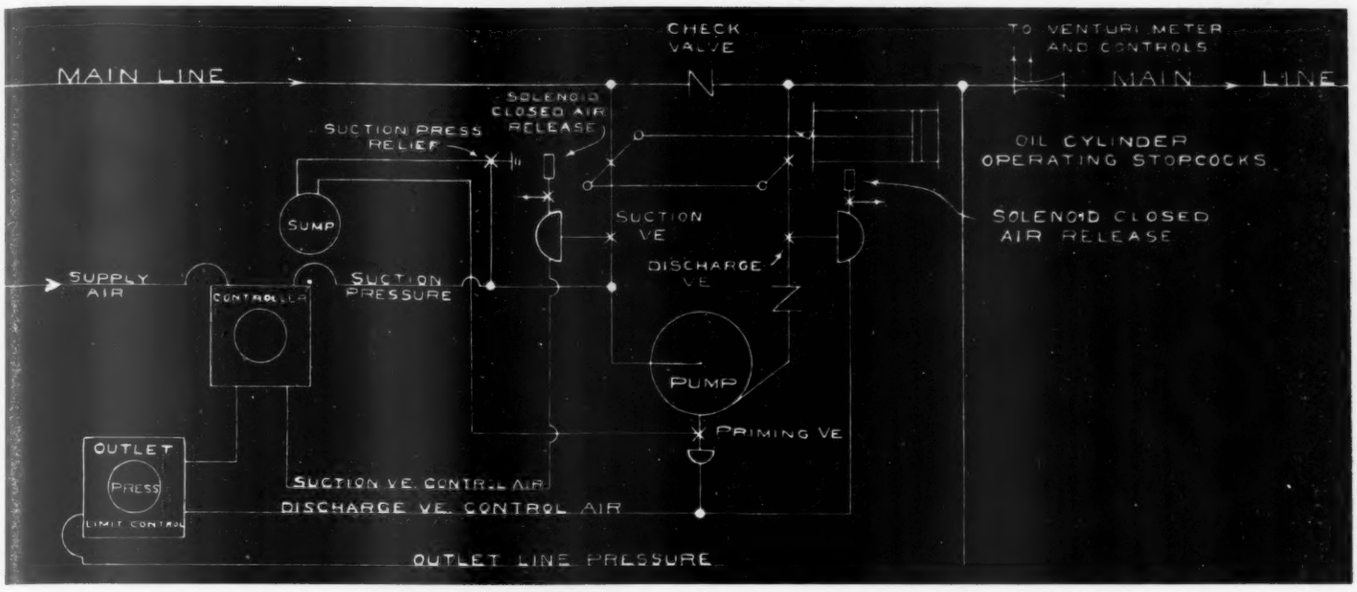
2. The entire control of starting and pumping depends on the suction pressure at the pump inlet nozzle. This basic principle is covered by U. S. Patent 2049233 and another application now pending.

When the station is pumping it is under the control of two pneumatically operated valves, one in the suction line to the pump and the other in the discharge line from the pump. The suction valve throttles the inlet pressure to keep it below, for example, a pressure of 100 lb. The discharge valve from the pump throttles to prevent the suction pressure from falling below, say, 15 lb. Obviously if the suction pressure is between these two valves both control valves are wide open. If the demand on the discharge side of the station is reduced, the suction pressure builds up and the





At the immediate right is seen a view of the six-stage pipe-line pump, alongside of which are mounted the bearing-temperature trips, the stuffing-box-temperature trips and the gasoline-temperature trips. Not shown are two similar trips operated by the bearing temperature of the motor. On top of the pump may be seen the priming valve with its control diaphragm. In the background is the control panel, closeup of which is seen at extreme right. The first panel has the outlet-line-pressure gage, outlet-line-pressure recorder and the high-pressure-air gage. The second panel has pump-discharge-nozzle-pressure gage, two small air gages, station outlet-pressure-limiting control, and control switch for manual operation. The third panel has the station clock; two bull's eyes to indicate transition of starter and energization of safety circuit; venturi meter showing rate dial, register and recorder; semiautomatic control, full automatic control and start control for semiautomatic operation, and sump-level indicator. The fourth panel shows pump-inlet-nozzle pressure, three small air-pressure gages, main valve control for pump, and reset control. The fifth panel shows inlet-line-pressure gage, inlet-line-pressure recorder, low-pressure-air gage and high to low-pressure air-regulating valve. Over the panel at the left is seen the station alarm bell.



Above: Diagram showing lines and valves of automatically controlled pump station. Station is operated as follows: (1) Station bypassing, flow through main-line check valve, stop cocks in closed position. (2) At starting rate venturi differential applies oil pressure to stop-cock cylinder. (3) Limit switch on stop-cock cylinder energizes air release solenoid on suction-valve diaphragm. (4) Controller primes pump and brings suction pressure up to 100 lb. Relief valve prevents excess pressure being applied to instruments. (5) When pump is started solenoid air release on discharge valve is energized. Controller opens discharge valve and puts station on line. (6) When pumping high-density fluids outlet-pressure limit control causes discharge valve to prevent overpressure in line. (7) At shut-down rate solenoid air-release valves shut control valves simultaneously with shutting of stop cocks by oil cylinder.

Right: View of control valves and auxiliary equipment for the station.

suction valve throttles against the station behind. If the demand on the system increases the discharge valve begins to throttle at the highest line capacity at which the pump has a positive suction pressure of 15 lb.

3. The starting sequence is of necessity a little more complicated and may be outlined as follows:

(*a*) At the starting flow rate, air pressure is applied to the inlet valve which floods the pump and purges it of air through a bleeder connected to the sump. The capacity of the bleeder is sufficient to allow the suction valve to function under control.

(*b*) When the pressure on the pump indicates that the purging is complete the motor is started and brought up to speed.

(*c*) When the motor reaches full speed air is supplied to the discharge valve and simultaneously to the bleeder shutoff valve. As the flow increases through the discharge valve the bleeder is no longer needed and shuts off. As the discharge valve opens it reduces the pressure at the inlet nozzle which in turn causes the suction valve to open and the station goes on the line.

This sequence of operation takes place in approximately 1 minute and the overload on the pump motor amounts to from 10 per cent to 20 per cent and lasts for only a few minutes. The automatic controls follow any surges that are created and the latter soon die away.

4. The control equipment is so designed that it is of a "fail safe" nature, that is, a failure at any vital part of the equipment will shut down the station and bypass it and will trip an alarm.

Safety features include temperature-operated thermal trips which protect the stuffing boxes, the bearings of the pump and motor, and the pump-fluid temperature. There is also a combustible gas alarm which will trip if gas in the station approaches the lower explosive limit.

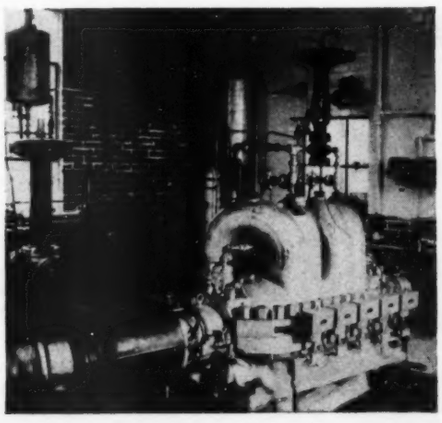
The protective equipment and the controls are so designed that if one device fails there is at lease one more path through which an undesirable condition can be detected and either remedied or an alarm given. A failure in any vital function in the station causes the station to shut down and bypass until the trouble is remedied.

5. During the past 6 years of operation with automatic equipment the controls have been revised until six relays on a panel 11 in. square immersed in oil constitutes the whole starting, running, and safety switch gear. There are seven thermal trips, one gas alarm, one sump alarm, one strainer alarm, one low-air-pressure alarm, one overpressure trip, and in stations equipped with pipe-line communication wires a code-call receiver enables the dispatcher to trip the alarm system. All of the protective devices are of the manual-reset type so that it is necessary for the engineer to locate the trouble before he can put his station back into operation.

In the event of power failure the station will shut down and bypass and a battery-operated alarm also warns the engineer if a power failure occurs. The pneumatic equipment has sufficient storage to start the station immediately after power has been restored.

THE COVER

The cover page illustration of the Pipe-Line Section shows tractors preparing to carry a section of pipe to be laid between the highway and the river at Devil's Canyon in the course of construction of the 442-mile crude-oil pipe line from Fort Laramie, Wyo., to Salt Lake City, Utah, for Utah Oil Refining Co. This is outstanding among the many pipe-line projects completed during the past year.

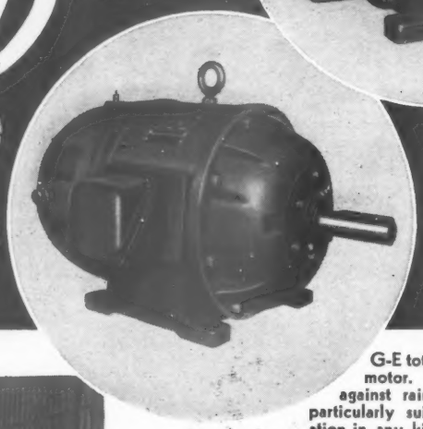


Another view of the pump

Long Life

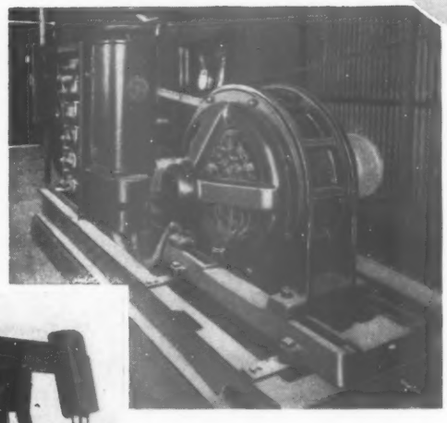
That's Why Electric Drive Cuts Depreciation Expense

G-E splashproof motor. This motor meets all the requirements of a pumping-rig drive in areas where medium weather conditions are encountered



G-E totally enclosed, fan-cooled motor. This motor is protected against rain, dust, and dirt and is particularly suited for long-time operation in any kind of weather. Like the G-E splashproof motor, it can be furnished in double- or triple-rated design to handle a variety of pumping loads

This G-E 2-speed oil-well motor has been in service in the California oil fields for more than 22 years



This G-E 5-hp well-pumping motor was recently installed in an Illinois oil field. It, too, can be relied upon for years of dependable operation

SIMPLE arithmetic is all you need to figure the savings in depreciation expense that electric drive for oil-well pumping makes possible. Electric drive means long-time service—and, naturally, annual depreciation can't help being low.

Here, for example, are two G-E motors, especially suited for oil-well pumping, on which you can depend for long life. They have practically nothing to wear out—there are no wearing parts except easily replaced bearings. Furthermore, the insulating varnish used on the windings is highly resistant to moisture, oil, and abrasion.

And remember—the life of an electric motor isn't limited by the life of a well. If your pumping load falls off at one well, just move the motor to another suitable location, connect it again, and you are ready to start your pumping rig.

Long life is only one advantage of electric drive for oil-well pumping. Note the others listed on the left. Our nearest representative will be glad to talk them over with you at your convenience. General Electric, Schenectady, New York.

Here are the other advantages of electric drive for oil-well pumping:

1. Low first cost
2. Small maintenance expense
3. Simple and economical operation
4. Operating characteristics to meet all kinds of pumping loads
5. Automatic starting and stopping according to schedule
6. Economical consumption of power
7. Portability
8. Easy on the mechanical equipment

GENERAL ELECTRIC

011-557

3 Years' Use Proves Success of Repair Job on Crankshaft

By WADE R. REED
General Superintendent, Pipe-Line Department,
Sinclair Refining Co.

THE repair job described herein was made in November 1937 on a diesel-engine crankshaft at the Sinclair Refining Co.'s main-line pump station at Humboldt, Kans. The shaft was broken approximately as shown in Fig. 1. The engine was a four-cylinder 665-hp. 22 by 32-in. air-injection diesel installed in 1917 and direct-connected to a 6½ by 36 double-acting triplex pump of 45,000-bbl. daily capacity.

A careful investigation to determine the cause of the broken shaft disclosed that this engine had bent the connecting rod on No. 2 cylinder while starting, about 6 years previous, due to water getting into the No. 2 cylinder through a leaky cylinder-head gasket. The rod was straightened and the engine put back in service. This original mishap had also bent the shaft slightly but this was not discovered at the time. The continued operation of the engine with the shaft in this condition was the cause of its later breakdown.

The cost of a new shaft, including freight, complete dismantling of the engine and reassembling would have been about $10,000. To have had the shaft repaired by the usual method of cutting the broken web off the crank pin and main journal, machining the ends of these parts and shrinking on a new web, including freight both ways to a shop with equipment large enough to handle the job, would have cost $5,000 to $5,500. The repair job as described herein was completed for approximately $2,200 and the shaft was not removed from the engine.

To inspect the shaft at the break, No. 1 cylinder head and piston were removed, also the main bearing caps, both sides of No. 1 crank, and this portion of the broken shaft lifted inside the box frame to determine whether or not the surfaces at the break were badly battered. These surfaces were found to be in good shape, as the engine was shut down immediately when the break occurred.

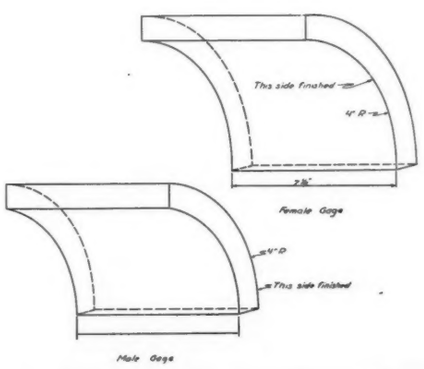


Fig. 2—Gages used for shaping inside corners of shrink band and outside corners of web to make a machine fit

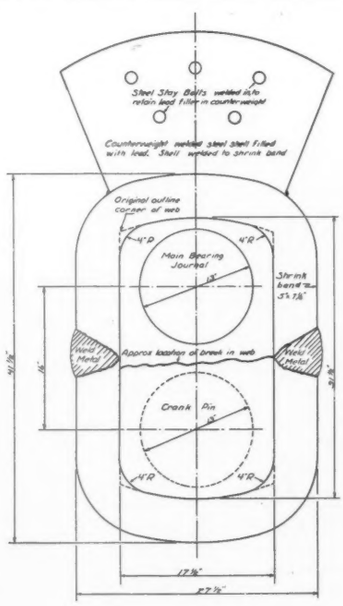


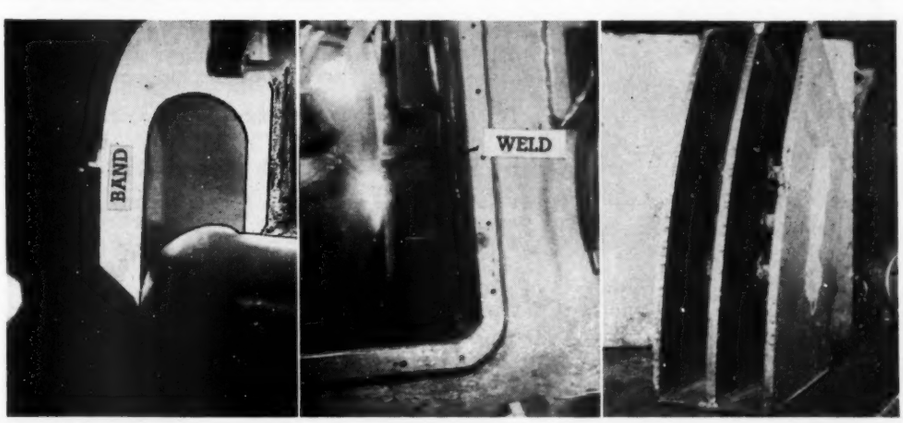
Fig. 1—Sketch showing how shrink band and counterweight were applied to broken web of crankshaft

Engine on which the novel crankshart repair was made. It is a 665-hp. 22-in. by 32-in. four-cylinder air-injection diesel direct-connected to a triplex pump

The alertness of the crew on duty in getting the engine shut down quickly at the first unusual sound no doubt saved this engine from far more disastrous results. After the shaft was thoroughly inspected, a heavy clamp was made and fitted over the crank web to draw it tightly together to determine whether or not the surfaces would fit back together again, and after repeated jarring of the shaft and tightening of the bolts, the bottom main-bearing shells, both sides of No. 1 crank were removed. The shaft was then rotated and tested with a dial indicator and it fitted back in place very closely.

Preparing Forgings

Upon definitely deciding on the method to be used in making the repair, the necessary drawings were made and the forgings ordered from a well-known steel company and arrangements made to have them machined in a nearby shop. These forgings had a tensile strength of approximately 100,000 lb. per sq. in. and weighed about 600 lb. each. The corners of the broken web were rounded as shown in Fig. 1. A male and female gage, Fig. 2, were made and carefully fitted together so that



The view at left shows the upper half of the shrink band, weighing 600 lb., being lowered into place over the crankshaft web. Center view shows upper and lower halves of shrink band after 8 or 10 beads have been placed in welding them together. Right view shows counterweight holder before it was installed

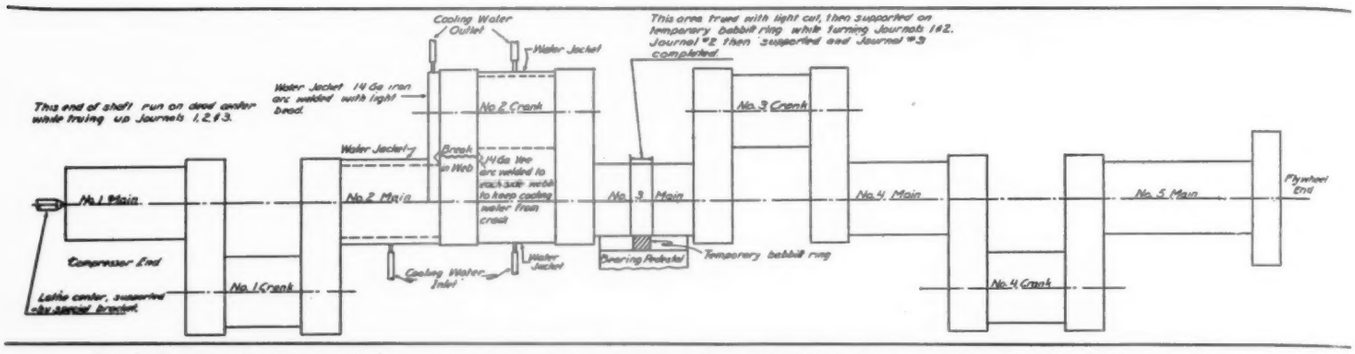

Cooling Water Outlet
Water Jacket
This area trued with light cut, then supported on temporary babbit ring while turning Journals #2. Journal #2 then supported and Journal #3 completed.
This end of shaft run on dead center while truing up Journals 1, 2 & 3.
Water Jacket 14 Ga iron arc welded with light bead.
No. 2 Crank
No. 3 Crank
Water Jacket
Break in Web
14 Ga. Iron arc welded to crack-side web to keep cooling water from crank
No. 1 Main
No. 2 Main
No. 3 Main
No. 4 Main
No. 5 Main
Flywheel End
Compressor End
Cooling Water Inlet
Water Jacket
Bearing Pedestal
Temporary babbit ring
Lathe center, supported by special bracket
No. 1 Crank
No. 4 Crank

Fig. 3—Diagram showing water-jacket arrangement used to prevent distortion of crankshaft during application of shrink band over broken web

all four corners would be rounded exactly alike, and the male half of the gage was used for checking the machining of the inside corners of the forgings. Most of the metal on the corners of the web was cut away with an acetylene torch and then finished by hand. The forgings were machined all over and considerable care taken with the machining and checking of all the inside dimensions to insure a good fit around the crank web.

In order to prevent possible distortion of the crankshaft, due to welding and heating of the forged band when applied, and to allow the bands to shrink tightly around the web after cooling, light sheet-iron water jackets were welded to the sides of the crank web and around the adjacent main journal and crank pin as shown in Fig. 3. The forgings were then put in place and the entire assembly clamped together and the shaft again carefully checked for alignment.

Preparations for Welding

Previous to the starting of the arc-welding operation, six first-class arc welders were given several hours' practice and tested with the particular type of welding rod to be used. When everything was ready, each half of the band was heated to about 300° with acetylene torches and kept at about this temperature during the entire welding job, pyrometers having been installed for checking the temperatures on each half. The crank was placed in a vertical position so that a welder could work on each side at the same time.

All four pistons and cylinder heads had previously been removed from the engine and electric fans placed to remove the heat from inside the crankcase as much as possible. Two helpers kept the band hot with acetylene torches while two welders welded, each crew working at about 30-minute intervals due to the heat inside the crankcase. After 23 hours and 40 minutes of continuous welding, the job was completed.

The band was permitted to cool very slowly, and after it was completely cold the shaft was checked for alignment and found to be out of line about 0.065 in. at the extreme outer end. This was easily corrected to within a few thousandths by spot heating. The band in cooling, tightened the two parts of the broken shaft together so tightly that the crack was hardly visible. Owing to the fact that the shaft had been run so long in an out-of-line condition, main journals Nos. 1, 2 and 3 were worn several thousandths out of round, and had to be trued. This was done by belting a small engine to the flywheel and rotating the shaft at about 40 r.p.m., using a dead center at the compressor end and carrying the other end of the shaft in its Nos. 4 and 5 bearings. The turning tool was carried on a slide parallel to the shaft and clamped to the main-bearing pedestals. The finishing of the journals was completed by hand-filing and polishing with emery cloth and wood blocks with grinding compound.

After the job was all completed, the broken web and band were thoroughly cleaned and given two coats of white enamel so that any movement between the surfaces could be detected by the appearance of cracks in the enamel. To date there has been no indication of any movement between these surfaces and the job seems to be entirely satisfactory.

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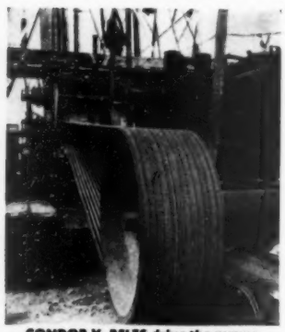
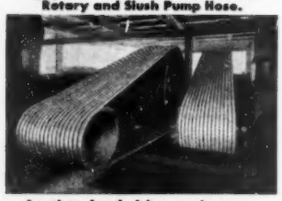
50 CONDOR WHIPCORD V-BELTS on a rotary drill rig.



CONDOR V-BELTS drive the pumps on a two-mile rotary drilling job. Equipment includes MANHATTAN Rotary and Slush Pump Hose.



Another hard drive made easy, economical and sure by CONDOR WHIPCORD V-BELTS.

MANHATTAN INTAKE HOSE on one end of a pump, driven by 15 CONDOR WHIPCORD V-BELTS.

MORE and more Condor V-Belts are the driving force on mechanical and diesel-electric drilling rigs, and on pumping units.

You can count on Condor Whipcord V-Belts for production and economy because of these *8 Points of Balance.*

1. Wide margin of strength—to take care of starting, peak or shock loads—obtained through endless "Whipcord" construction.
2. Low ultimate stretch. We know of no other construction which approaches Condor's extreme lack of stretch. That accounts for their long life in service.
3. Uniform Flexibility—to withstand constant and rapid flexing over sheaves.
4. Maximum resistance to structural breakdown—the natural result of the Condor construction dissipates destructive internal heat.
5. Smooth running. Condor V-Belts are vulcanized in steel molds to insure exact and uniform cross sections and unvarying lengths.
6. Maximum traction—due to the correct design and construction of the belt's component parts in addition to accurate shaping.
7. High resistance to side wear—due to special close woven but flexible cover fabric.
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Vapor-Phase Engine Cooling Introduced on Pipe Lines

(Continued from Page 128)

equipment has been installed on many gas lines as a part of dehumidifying installations. Benefits derived from drying of gas are well known. Freeze-ups are prevented, and if refrigeration is used in the drying process, the line capacity is increased due to cooling of the gas. Vapor-phase engine cooling can play an important part in refrigeration because steam taken from the engines can replace the flame used in the absorption refrigeration process. (Absorption refrigeration is well known for its household application in the gas refrigerator.) Vapor-phase cooling has been applied in this capacity at ice-manufacturing plants, and it was found that a 100-hp. loaded engine provides enough waste heat to manufacture 5 tons of ice per day. Waste heat from engines using high-temperature cooling is being used in the Oklahoma City field for oil-treating purposes in conjunction with the hydraulic oil-well pump. With waste heat available as steam, the imaginative operator will devise practical heat applications.

It has been demonstrated in practice that when an engine is equipped for vapor-phase cooling enough waste heat can be recovered from the exhaust gases and from the jackets to bring about an overall thermal efficiency of 74 per cent. Thus through this improvement the internal-combustion engine can be made one of the most efficient machines known today.

Integrating Tachometers Show Reciprocating Pump Flow

(Continued from Page 109)

measurement at intermediate stations, using carefully calibrated tankage as criteria at the initial and terminal points, may be gaged from the following example.

A tender with a gross capacity of 76,380 bbl. was pumped through a 250-mile line section, by five intermediate stations, three of which were equipped with flow-rate tachometers, with the following results:

(Continued on Next Page)

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The two Regulators here seen are on a gas line leading to a Texas refinery, which is owned by one of the great oil-producing companies. Like all C-F low-pressure Regulators, they afford protection in case of failure of gas supply. Their merits include sturdy construction, sure precision, and long life, as well as convenience of installation and maintenance.

C-F 2" Low-Pressure Regulators with Automatic Cut-Off Attachment.

Write for new Catalog of Regulators for All Uses.

The CHAPLIN-FULTON MFG. CO.

28-40 PENN AVE. CF PITTSBURGH, PA.

Station No.	Stream traverse mi. from initial station	Gage medium	Gross bbl.
Initial	0	Tank	76,380
1	43	None*	.....
2	89	Flow-rate tachometer	76,359
3	139	Flow-rate tachometer	76,342
4	192	Flow-rate tachometer	76,372
5	244	None*	.....
Terminal	261	Tank	76,347

*Booster station.

Average gross capacity of tender, 76,364 bbl.
Maximum flow-rate tachometer error station 3 = —0.03 of 1 per cent.

The flow-rate device is an industrial-type tachometer connected to the pump-pinion shaft driven through a suitable speed increaser, with a dial calibrated to read the momentary rate of flow in barrels per hour. A roller counter similar to that used in automotive speedometers is built into the tachometer case to integrate the barrels pumped over unit time. A clutch remotely controlled by the pipe-line flow through the medium of a butterfly valve and hydraulic column connects or disconnects the driving mechanism of the tachometer to satisfy the flow conditions prevailing at the pump. By this method the tachometer does not operate when the pump is idling and the barrels integrated when the pump is discharging are gross.

In computing the speed increaser gear ratio cognizance was taken of the pump's volumetric efficiency, pinion shaft to crankshaft ratio and displacement.

The probationary period of these instruments has long since passed and the accuracy has never dropped below two-tenths of 1 per cent when measuring gross barrels.

Welding Technique in Vanguard Of Pipe-Line Building Progress

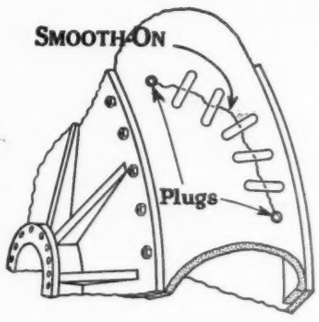
(Continued from Page 131)

from side to side. Rather than completing each joint at a time, the welding alternates between three joints, this practice preventing the welds from getting too hot. Each bead is cleaned and peened before application of the next.

Testing 26 random joints in a recent line of stainless-steel pipe welded by this procedure revealed absolutely no leaks under 1,200-lb. pressure.

The improved procedure which obviates welding difficulties due to presence of sulfur in oil-line pipe 8 to 10 years old and which opens the way to large

CRACKS
lastingly sealed
with SMOOTH-ON No. 1



Smooth-On No. 1 tamped into a crack expands in hardening and forms a permanently pressure-tight seal. The repair is quickly made without heat or special tools, and requires no previous experience.

With a can of Smooth-On No. 1, you will be prepared to stop leaks in boilers, tanks, heat exchangers, pump shells, pipe lines, etc., make joints and seams tight, and tighten loose bolts, rivets, fixtures and equipment parts.

Buy Smooth-On in 1-lb., 5-lb. cans or 25-lb., 100-lb. kegs from your supply house or if necessary, from us. For your protection, insist on Smooth-On—used by engineers since 1895.

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The "Safety-Pull" ratchet lever hoist is the safest hoist built because it is the only hoist equipped with a dual ratchet and pawl assembly, independent of each other, and the handle is always under control. (Cannot slip or drop load.)

All "Safety-Pull" hoists are tested in our own factory at 100% over their rated capacity.

Capacities from ¾ to 15 tons, weighing from 14 to 150 pounds.

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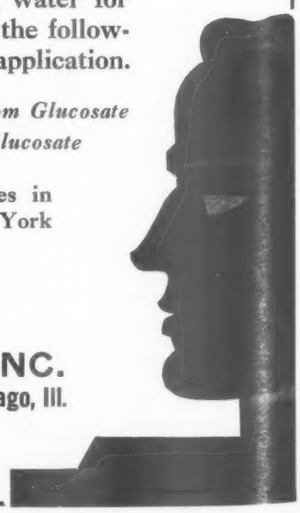
Have you investigated IN-HIB-CO, our corrosion resistant coating?



cost savings in repair of such lines and in reuse of such pipe, involves feather-edge beveling, followed by heating and cleaning the pipe all around for a distance of approximately 6 in. from the end and then butting the ends tightly together for welding. The actual welding of the first bead is done with 5/32-in. electrode using as little heat as possible. One-eighth-inch electrode is used for the first bead on pipe in which the amount of sulfur causes undue trouble.

This procedure has been found of distinct advantage over the former practice of simply beveling the pipe ends with the expectation of getting sulfur-free metal for the weld and then welding the first bead with large electrode and high heat. The new procedure eliminates the cracked welds encountered with the previous practice and permits production of approximately 70 welds on 6-in. pipe and approximately 55 welds on 8-in. per man per 9 hours (by the stovepipe method).

In addition to this procedure of effectively salvaging pipe from old sulfur-bearing oil lines, pipeline companies continue saving money by maintaining lines with arc welding, the quick, easy method of repairing pitted areas of pipe (Fig. 3), applying half soles (Fig. 4), reconditioning leaky couplings (Fig. 5), etc.

Added to these advances in pipe-welding procedure and technique, important improvements and refinements in welding equipment increase the advantages of arc welding in this field. These equipment advances have to do with increased simplicity of welder operation by easily adjusted self-indicating controls which assure obtainment of a welding arc of just the right type and intensity for every application; easier handling and moving of engine-driven welding units (both gasoline and diesel), by virtue of exceptionally light weight and size for given capacity; easier, faster and higher-quality welding at greater economy through development of new electrodes for specific purposes; and increased operator efficiency by virtue of improved accessories and supplies for welding.

•

The Value of Operating Kinks

When employes devise methods which improve ways for getting the job done, the benefits derived by both the company and employes are greater than those which can be definitely valued in terms of dollars and cents. Operating ideas, kinks, or practical suggestions may take the form of a device made by an employe for the purpose of accomplishing results with savings in effort and money which may be measured so that tangible results may be evaluated.

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Progress in Utilization Of Natural Gas

By RICHARD H. COOK
Research Dept., Houston Pipe Line Co., Houston, Tex.

NATURAL gas is a mixture of gaseous hydrocarbons having less than six carbon atoms. These are methane, ethane, propane, butane. pentane and some of the isomers of butane and pentane. In general, they occur in diminishing amounts in the order named.

Natural gas has been known for many years; however, it was thought of only as a fuel until the method of making carbon black was discovered. Even then many of the gas-producing states would not permit the manufacture of carbon black from other than sour or high sulfur gases. which could not be sold as domestic fuel. The first carbon-black plants recovered very small amounts of carbon by rather crudely burning the gas so that the combustion products were carbon, carbon dioxide, carbon monoxide, hydrogen and water. No attempt was made for many years to use the carbon monoxide and hydrogen, or to improve the yield of carbon black. For several years the yield of carbon black from natural gas was as low as 0.8 lb. per M.c.f. In the United States during 1938 the average was only 1.47 lb. per M.c.f. This may seem like a rather high yield compared to 0.8 lb. previously obtained. however, the actual carbon contained in 1,000 cu. ft. of methane is over 32 lb. There are several new processes for the recovery of carbon black which claim as high as 17 lb. per M.c.f. These processes claim also to use the byproduct hydrogen and carbon monoxide in the synthetic preparation of methyl alcohol (methanol). Already certain large solvent companies are using methane to make methanol. These developments, it might be said, are due to the research on the part of the carbon-black industry. They have opened a vista through which the chemical companies can see, in a small way, the massive potentialities ahead. No less than 20 chemical companies now have chemical research directed toward the utilization of natural gas as a raw material. Almost every technical or trade publication has some article on the chemistry of natural gas.

The carbon dioxide which is given off when gas is burned as a fuel is now being cleansed and compressed to dry ice for use as a refrigerant.

Many new words have been added to the everyday language of the men in the gas industry; among them, with brief description of each, are:

1. *Nitration.* The adding of NO_2 radical or radicals to any of the components in natural gas. This reaction renders the gas more reactable for further synthesis and in some cases produces a splendid explosive similar to nitroglycerin. This reaction was developed in 1937.

2. *Chlorination.* The replacing of one or more of the hydrogen atoms in natural gas with one or more chlorine atoms. These products are very valuable. Some of them are chloroform, carbon tetrachloride, etc. In all of these reactions the byproduct is hydrochloric acid, which is used in the acid treatment of oil wells that are producing from chalk or carbonate formations.

3. *Sulfonation.* The reaction of sulfur with the hydrocarbons in natural gas forming carbon bisulfide, diethyl sulfide, mercaptans, etc. This type of reaction is under vigorous research and there is promise that the unwanted byproduct hydrogen sulfide can be eliminated by the use of certain catalysts, and reaction conditions.

4. *Oxidation.* Reactions of this type are used to produce corresponding alcohols, aldehydes, and organic acids. These reactions are produced by the use of one or more of the following: Catalysts. heat, pressure, or oxidizing reagents.

5. *Esterification.* This reaction is not used directly on the natural gas but rather on the alcohols produced from them, e.g., methyl alcohol produced from methane can be reacted with cellulose (wood fiber) to produce methyl cellulose, a plastic and by the same token ethyl alcohol produces ethyl cellulose, another plastic used in paints, fabrics, etc.

6. *Pyrolysis.* A term given most all reactions where heat is used to produce the reactions. This has the largest list of applications, and many things can be produced by it.

7. *Alkylation.* The combination, by high temperatures and pressures, of an olefin (unsaturated hydrocarbon) with a paraffin hydrocarbon from natural gas. These straight-chain hydrocarbons react with the olefins to form side-chain compounds which not only have splendid octane ratings, but also have very good blending properties. Motor fuels with as high as 115-octane rating are claimed possible with this new process.

8. *Polymerization.* When a substance changes sharply into another substance with double or

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triple molecular weight as formaldehyde (CH_2O) a volatile liquid changes by heat into paraformaldehyde $(CH_2O)_n$, a crystalline solid, the phenomenon is called polymerization. By this reaction short-chain hydrocarbons can be made into long-chain and ring compounds.

9. *Cycloation.* The formation of ring compounds from straight-chain hydrocarbons by oxidation and condensation. This is not the same as polymerization, because this reaction may produce hydrogen or water as byproducts.

10. *Electrical catalysis.* Reactions of this type are numerous and range from the direct contact of an electric arc with the gases to be reacted, to the use of glow tubes. Most of the processes using this type of reaction are still in the experimental stage. Electrical catalysis has been employed to make carbon black, acetylene, formaldehyde hydrogen, etc.

It has just recently been announced by a large oil company that a plant will be constructed to produce synthetic rubber from butane gas. Other discoveries, which are destined to play an important part in the future of the gas industry, are aromatization and isomerization.

In the actual burning of gas the chemical effects must not be underestimated. We have in the past taken for granted the fact that natural gas was a preferred heating agent, because it is clean, easy to transport and handle, and that its cost is comparable with that of any other fuel. This is all true but there are true chemical values obtained from the use of gas as a fuel that are not obtained when other fuels are used. For example, the reduction of finely ground, low-grade iron ore by using natural gas, that has been heated to the disassociating temperature and then passed through the heated ore. Another example is the injecting of small amounts of steam into the burner in a furnace where steel is being heated to keep the atmosphere a reducing one. These and many more applications are chemical.

After natural gas has served its purpose as a fuel and the flue gases only remain, it has not given up all of its industrial value. The flue gases are, in some plants, passed through sea water to cause the magnesium compounds to precipitate. Flue gases are used for storing various wares that are subject to oxidation. It is also used to carbonate water in water treatment.

Natural gas has a very wide usage in the steel industry. It is used as a fuel, as a carburizing agent, and in the annealing processes. The national-defense program has been responsible for at least two chemical projects. One is the development of synthetic rubber, the other, production of toluol, from which TNT is made. With these new basic tools, the chemical industry should and will develop as large a list of chemical products from gas as are now being produced from coal.

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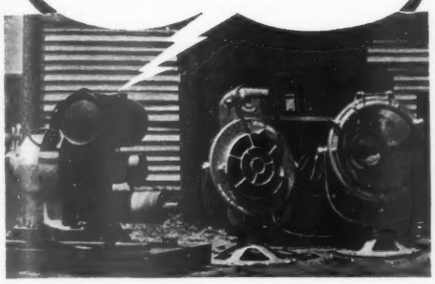

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Several examples of the way in which some of the types of Horton tanks are used at pipe line terminals, bulk plants and pumping stations are illustrated on these pages. For complete information or quotations on units to meet your individual requirements, please write our nearest office. No obligation, of course.

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Personnel of Crude-Oil Pipe-Line Companies

The companies listed are confined largely to operators of crude-oil trunk lines and do not include several gathering systems operated by refining companies in close proximity to their plants. For personnel of refining companies see survey in issue of March 28, 1940

A

Ajax Pipe Line Corp., Box 801, Tulsa, Okla.
William A. McAfee, *Pres.;* Rawleigh Warner and Paul Griffin, *V. P.s;* M. E. Newcomer, *Sec.;* W. J. Semple, *Treas.;* S. V. Kane and O. W. Bailey, *Asst. Treas.* C. L. Bushnell, *Asst. Sec.;* J. R. Doles, Landers Bldg., Springfield, Mo., *Supt.;* W. S. Dyer, Landers Bldg., Springfield, Mo., *Supt.;* C. P. Morgan, Landers Bldg., Springfield, Mo., *Mast. Mech.;* S. L. Westlake, *Mech. Engr.* 787 miles, 10-in.

Alamo Pipe Line Co., 808 Frost National Bank Bldg., San Antonio, Tex.
Edwin M. Jones, *Pres.;* Harry Ezzell, *V. P.* and *Sec.-Treas.;* E. C. Rach, *V. P.;* Marguerite Sellers, *Asst. Sec.;* Kenneth Wimer, *Asst. Treas.* 20 miles 4 and 6-in.

Aloco Pipe Line Co., 902 First National Bank Bldg., Dallas, Tex.
Toddie L. Wynne, *Pres.;* D. R. Zachry, *V. P.* and *Treas.;* Verne H. Maxwell, *Sec.*

American Liberty Pipe Line Co., 902 First National Bank Bldg., Dallas, Tex.
Toddie L. Wynne, *Pres.;* C. W. Murchison, *V. P.;* Verne H. Maxwell, *Sec.;* D. R. Zachry, *Treas.* 183 miles, 8⅝-in.

American Petroleum Co. of Texas, Petroleum Bldg., Houston, Tex.
G. O. Irvine, *Pres.;* T. J. Arnold, *V. P.;* G. L. Townsan, *Sec.;* C. T. Carnes, *Treas.;* J. B. Joyce, *Oper. Mgr.;* S. J. Bell, *Supt.;* J. H. Bringhurst, *Ch. Engr.;* J. M. Cook, *Sales Mgr.;* H. P. Sellers, *Ch. Chem.* 63 miles

Amsco Pipe Line Co., P.O. Box 870, Corpus Christi, Tex.
W. M. Averill, *Pres.;* Ward C. Pearl and John Manley, *V. P.s;* A. W. Vallentyne, *Sec.;* Forest R. Lowrey *Treas.;* Harry A. Roberts, *Constr. Supt.;* T. E. Johnson, *Ch. Gauger;* A. R. Delsman, *Ch. Accountant;* Margaret L. Moore, *Pur. Agt.;* W. G. Pillow, *Oil Run Dept. Head;* L. W. Denham *Foreman.* 150 miles.

Anderson-Prichard Pipe Line Corp., 1000 Ramsey Tower, Oklahoma City, Okla.
L. H. Prichard, *Pres.;* J. Steve Anderson and P. H. Anderson, *V. P.s;* T. H. Marshall, *Sec.;* P. H. Anderson, *Treas.;* George H. Burruss, *Gen. Mgr. Ref.;* Weston Payne, *Mgr. Okla. City Div.;* J. B. Burruss, *Mgr. Cyril Ref.;* John Bates, *Supt. Cyril Div.* 48 miles, 4 and 6-in.

Arkana Transit Corp., Ricou-Brewster Bldg., Shreveport, La.
J. J. Frommer, *Pres.;* D. W. Harris, Slattery Bldg., Shreveport, *V. P.;* J. P. D'Artois, *Sec.;* W. F. Baldwin, *Treas.;* T. J. Heard, Slattery Bldg., Shreveport, *Asst. Sec.;* F. J. Decker, *Asst. Sec.;* B. R. Muirhead, Slattery Bldg., Shreveport, *Asst. Treas.;* M. L. Spence, *Asst. Treas.;* E. B. Charlton, Box 90, Haynesville, La., *Gen. Mgr.* 35 miles, 4 and 6-in.

Arkansas Fuel Oil Co., Shreveport, La.
T. W. Tutwiler, *Pres.;* D. W. Harris, *V. P.* and *Gen. Mgr.;* A. F. Holliday and J. A. Welch, *V. P.s;* J. S. Sheffield, *Sec.;* M. J. Lasseigne, *Treas.;* A. H. Weyland, *Gen. Supt.;* H. T. Goss, *Ch. Engr.;* J. Lucas, *Mgr. of Purchases;* G. L. Gano, *Mgr.;* P. T. Thibodaux, *Oper. Supt.;* R. L. Waldron, Oil City, La., *Dist. Supt.;* C. O. Rhodes, Haynesville, La., *Dist. Supt.* 334 miles, 2 to 8-in

Arkansas Pipeline Corp., Shreveport, La.
D. W. Harris, *Pres.;* T. W. Tutwiler, *V. P.;* J. S. Sheffield, *Sec.;* M. J. Lasseigne, *Treas.;* A. H. Weyland, *Gen. Supt.;* H. T. Goss, *Ch. Engr.* J. Lucas, *Mgr. of Purchases;* G. L. Gano, *Mgr.;* P. T. Thibodaux, *Oper. Supt.;* P. H. Duval, Greggton, Tex., *Dist. Supt.;* R. L. Waldron, Oil City, La., *Dist. Supt.* 34 miles, 2 to 6-in. One-half interest in 144 miles, 2 to 8-in.

Ashland Oil & Transportation Co., Ashland, Ky.
Paul G. Blazer, *Pres.;* W. H. Keffer, E. F. Wells, *V. P.;* E. W. Seaton, *Treas.;* E. L. McDonald, *Sec.* and *Gen. Counsel;* M. K. Lovell, *Pur. Agt.* 800 miles.

Atlantic Pipe Line Co., Magnolia Bldg., Dallas, Tex.
E. J. Henry, *Pres.;* J. H. Wood, Jr., R. C. Tuttle, and L. M. Goldsmith, *V. P.s;* B. G. McKain, *Sec.;* Paul Shuman, *Treas.;* J. H. Wood, Jr., *Gen. Mgr.;* R. P. Paden, *Gen. Supt.;* C. M. Southern, *Asst. to Gen. Supt.;* J. W. Williams, *Ch. Operating Mgr.;* T. M. Hart, *Telephone Supervisor;* Curt Oppel, *Pur. Agt.;* L. S. Mobley, Box 389, Port Arthur, Tex., *Supervisor of Terminals;* J. L. McGrew, Box 1190, Midland, Tex.; D. M. Blackstock, Box AA, Refugio, Tex.; T. L. Hare, Box 1031, Longview, Tex., *Div. Supts.;* R. E. Love, 1460 Orange St., Beaumont, Tex.; G. A. Bonge, Hearne, Tex., *Maintenance Supts.* 981 miles, 4 to 10-in.

Atlas Pipe Line Corp., 619 Market St., Shreveport, La.
H. K. Phelps, Jr., *Trustee;* B. F. Connolly, *Gen. Mgr.;* J. L. Polk, *Agent;* H. M. Arthur, Sr., *Supt.;* R. W. Nix, *Pur. Agt.;* R. C. Huff, *Ch. Dispatcher:* E. A. Magher, *Ch. Engr. Pipe Lines;* H. M. McDonald, *Supt.* Tex. Div.; G. R. Hayes, *Station Engr.* Hollywood Sta.; F. G. Montgomery, *Construction Foreman.* 166 miles, 6 and 8-in.

B

Baird Refining Co., Baird, Tex.
Myron G. Blalock, *Pres.;* J. R. Parten, *V. P.;* R. P. Hargis, *Sec.;* D. C. Biggers, *Treas.;* Sylvester Dayson, *Gen. Mgr.;* L. G. Duffilho, *Asst. Mgr.;* J. B. Miseheimer, *Supt.* 6 miles, 2½ and 3-in. leased.

Barnsdall Pipe Line Co., Box 2039, Tulsa, Okla.
E. B. Reeser, *Pres.;* D. R. Snow and Ralph E. Sleppy, *V. P.s;* James A. Dunn, *Sec.;* L. D. Messner, *Treas;* H. E. Ammerman, Victoria, Tex., *Supt.* 120 miles, 3 to 6-in.

Basin Pipe Line Co., Big Spring, Tex.
C. L. McIver, *Pres.* and *Mgr.;* Myron G. Blalock, *V. P.;* A. L. Lipscomb, Jr., *Sec.-Treas.;* B. M. Blankenship, *Supt., Wasson Pump Station;* James McIver, *Station Engr.,* Wasson Pump Station Donald Dean, *Station Engr.,* Wasson Pump Station. 117 miles, 4 and 6⅝-in.

Bay Petroleum Corp., Box 957, Denver, Colo.
C. U. Bay, *Pres.;* R. V. Rodman, *V. P.;* Dent N. Hand, *Sec.*

Bay Pipe Line Corp., 212 Bearinger Bldg., Saginaw, Mich.
Howard D. Atha, *Pres.;* James C. Graves and Edward Reiser, *V. P.s;* T. G. Caley, *Sec.* and *Treas.;* Edward Reiser, *Gen. Mgr.;* James F. Ward, *Supt.* 53 miles, 4 and 6-in.; 40 miles, gathering line.

ABBREVIATIONS USED

Chm. Bd.—Chairman of Board
Pres.—President
V. P.—Vice President
Sec.—Secretary
Treas.—Treasurer
Gen. Mgr.—General Manager
Pur. Agt.—Purchasing Agent
Supt.—Superintendent
Ch. Engr.—Chief Engineer
Ch. Dispatcher—Chief Dispatcher
Dist. Mgr.—District Manager
Div. Mgr.—Division Manager

Bell General Transit Corp., 1310 National Bank of Tulsa Bldg., Tulsa, Okla.
M. L. Freese, *Pres.;* D. D. Irwin and M. M. McMurrey. *V. P.s;* A. H. Meadows, *Sec.;* Benedict I. Lubell, *Treas.;* E. R. Vawter, Overton, Tex., *Ch. Engr.* 36 miles, 8-in.

Bell Oil & Gas Co., 1310 National Bank of Tulsa Bldg., Tulsa, Okla.
S. L. Lubell, *Pres.;* I. A. Anson, B. I. Lubell, and M. L. Freese, *V. P.s;* Ben Piepgrass, *Sec.;* B. I. Lubell, *Treas.;* B. F. Gilchrist, Burkburnett, Tex., *Supt.* 145 miles, 2 to 6-in.

Ben Franklin Refining Co., National Bank of Tulsa Bldg., Tulsa, Okla.
I. Arthur Anson, *Pres.;* M. L. Freese, *V. P.;* Ben P. Piepgrass, *Sec.;* Benedict I. Lubell, *Treas.;* E. S. Horner, Box 788, Ardmore, Okla., *Supt.;* Harry Hutson, Ardmore, *Labor Foreman;* Melvin Miller, Ardmore, *Office Mgr.;* W. S. Horton, Ardmore, *Labor Foreman;* F. V. Clark, Ardmore, *Chem.;* E. C. Livingston, Ardmore, *Ch. Operator;* Joe Whitehurst, Ardmore, *Ch. Operator;* R. L. Barnard, Box 441, Healdton, *Pipe Line Supt.* 69 miles, 2 to 6-in.

Big Spring Pipe Line Co., Big Spring, Tex.
Joseph Edwards, *Pres.;* R. T. Piner, *V. P.;* G. H. Hayward, *Treas.;* J. Henry Edwards, *Supt.;* Roy Lee, *Asst. Supt.* 15 miles, 4-in.

Bryson Pipeline & Refining Co., Inc., Bryson, Tex.
O. R. Tipps, *Pres.;* C. J. Bohur, *V. P.;* Lino Lienaux, *Sec.-Treas.;* Rex Young, *Ref. Mgr.;* Clyde Hall, *Ref. Supt.;* Knox Garvin, Jr., *Pipe Line Supt.;* Thio Turner, *Ch. Gager;* John Tyra, *Connection Foreman.* 100 miles, 2 to 4-in.

Buckeye Pipe Line Co., 137 West North St., Lima, Ohio.
G. E. Pifer, *Gen. Mgr.;* W. C. Ludwick, Marietta, Ohio, *Supt.;* H. K. Floyd, *Supt.;* Grant Barbee, Marietta, Ohio, *Asst. Supt.;* C. W. Tomford, *Asst. to Supt.;* F. J. Callahan, *Asst. Sec.;* H. L. Pew, *Asst. Sec.;* H. W. Taylor, *Engr.;* J. D. Bailey, *Engr.;* J. R. McNeff, *Oil Dispatcher; Dist. Foremen:* F. R. Smith, Marietta, Ohio; R. E. Soules, Marietta, Ohio; C. V. Shepard, Newark, Ohio; G. A. Scrafford, Newark, Ohio, *Foreman of Gagers.*

C

California Co., 225 Bush St., San Francisco, Calif.
R. K. Davies, M. E. Lombardi, A. S. Russell, and G. E. Kennedy, *V. P.s;* B. W. Letcher, *Sec.;* G. J. O'Brien, *Treas.* 68 miles, 8 and 10-in.

California Pipe Line Co., 225 Bush St., San Francisco, Calif.
M. E. Lombardi, *Pres.;* A. S. Russell and R. C. Stoner, *V. P.s;* B. W. Letcher, *Sec.;* G. J. O'Brien, *Treas.;* H. F. Davies, Denver, Colo., *Mgr.;* R. D. Copley, Denver, Colo., *Asst. Mgr.;* J. B. Wickersham, Quealy, Wyo., *Supt.* 20 miles, 4-in.

Canadian Oil Companies, Ltd., Terminal Bldg., Toronto, Ont., Canada
John Irwin, *Pres.;* Frank C. West, *V. P.;* H. F. Hoecker, *Sec.;* C. W. Walker, *Treas.;* E. A. Smith, Petrolia, Ont., Canada, *Ref. Supt.* 16 miles, 2 and 4-in.

Canyon Pipe Line Co., Centralia, Ill.
J. A. Johnson, *Pres.;* T. J. Johnson, *V. P.;* Geraldine Davis, *Sec.* 80 miles, 4-in.

Cardinal Pipe Line Corp., 2121 Alamo National Bldg., San Antonio, Tex.
George C. Sanford, *Pres.;* Frank C. Paine, *V. P.;* Walter J. Buzzini, Jr., *Sec.-Treas.;* George B. Pickett, *Supt.;* T. C. Lasater, *Station Engr.* 7 miles, 4-in.

Champlin Refining Co., Enid, Okla.
H. H. Champlin, *Pres.;* Joe N. Champlin, *V. P.;* D. W.

Cotton, *Sec.* and *Treas.*; E. G. Wilmoth, *Mgr. of Pipe Lines;* B. Payne, *Field Supt.* 400 miles, 6 and 8-in.

Col-Tex Refining Co., 1000 Ramsey Tower, Oklahoma City, Okla.

L. H. Prichard, *Pres.*; J. Steve Anderson, *V. P.*; P. H. Anderson, *Sec.* and *Treas.*; C. L. Mayhall, *Chg. Refined Oil Sales;* C. H. Dresser, *Chg. Ind. Sales;* George H. Burruss, *Gen. Mgr. Ref.*; M. H. Champion, *Traf. Mgr.*; W. M. Sturges, *Credit Mgr.*; Neal Prichard, Colorado City, Tex., *Ref. Supt.* 45 miles, 3 and 4-in.; 25 miles, 4-in. leased.

Comanche Pipe Line Corp., Box 1275, Monahans, Tex.

J. C. Ratliff, Jr., *Pres.*; T. B. Harris, Jr., *V. P.*; W. H. Waldrop, *Sec.* and *Treas.* 50 miles, 2 and 4-in.

Continental Pipe Line Co., Ponca City, Okla.

Dan Moran, *Pres.*; W. H. Ferguson, G. F. Smith and J. G. Dyer, *V. P.s;* A. C. Frazer, *Sec.*; G. F. Smith, *Treas.*; J. G. Dyer, *Mgr.*; M. H. Shanahan, *Asst. Mgr.*, W. L. Kygar, *Asst. to Mgr.*; A. C. Wilkerson, *Gen. Supt.*; *Dist. Supts.:* T. R. Batte, Gulf Coast, Houston, Tex.; E. F. Huffman, Okla.-Kans., Ponca City; E. O. Sturm, Wichita Falls, Wichita Falls, Tex.; Neil Stallard, Panhandle, Texon, Tex. 1,729 miles, 2 to 10-in.

Cosden Pipe Line Co., Big Spring, Tex.

R. L. Tollett, *Pres.*; B. H. Roth, *V. P.*; A. C. Borders, *Sec.*; A. V. Karcher, *Treas.*; R. W. Thompson, *Pipe Line Supt.* 85 miles, 2 to 8-in.

Cox & Hamon Pipe Line Co., Magnolia Bldg., Dallas, Tex.

J. S. Ewing, *Pres.*; Patrick Downing, *V. P.*; M. O. Dickinson, *Sec.*; C. E. Enloe, *Treas.* 50 miles, 4-in.

Cushing Refining & Gasoline Co., Cushing, Okla.

R. C. Jones, *Pres.*; Rex H. Winget, *V. P.* and *Gen. Mgr.*; M. E. James, *Sec.* and *Treas.*; E. O. Derrick, *Sales Mgr.*; J. A. Dickey, *Auditor;* J. H. Hutchinson, *Gen. Supt.*; F. A. Davis, *Supt. Pipe Lines;* Henry A. Booher, *Ref. Supt.*; T. B. Randall, *Ch. Chem.* 135 miles, 2 to 10-in.

D

Deep Rock Oil Corp., Atlas Life Bldg., Tulsa, Okla.

H. N. Greis, *Trustee;* A. L. Dade, *Mgr. P. L. Dept.*; J. H. Tubbs, *Asst. Supt.*; *Dist. Supts.:* Isaac Biddle, Bristow, Okla.; M. L. Eckley, Drumright, Okla.; G. D. Biddle, Seminole, Okla. 519 miles.

Derby Oil Co., Wichita, Kans.

Carl Fisher, *Pres.*; H. E. Zoller, *Exec. V. P.*; S. P. Wallingford, *V. P.*; E. G. Wasser, *Sec.*; E. C. Claiborne, *Treas.*; John Schell, *Mgr. Pipe Lines;* L. E. Woods, *Supt.*; E. Edwards, Hutchinson, Kans., *Foreman.* 187 miles, 2 to 6-in.

Duval Pipe Line Co., 806 Second National Bank Bldg., Houston, Tex.

O. D. Robinson, *Pres.*; D. D. Johnson, D. W. Hovey, and W. S. Hallanan, *V. P.s;* William H. Moreland, *Sec.-Treas.*; G. E. Casey, 909 Nixon Bldg., Corpus Christi, Tex., *Supt.*; F. C. Barr, Benavides, Tex., *Asst. Supt.* 65 miles, 6-in.

E

East Texas Refining Co., Tower Petroleum Bldg., Dallas, Tex.

W. G. Skelly, Tulsa, Okla., *Pres.*; C. C. Herndon, Tulsa, Okla., *V. P.*; L. F. Brothers, *V. P.*; F. T. Hopp, Tulsa, Okla., *Sec.-Treas.*; John J. Thomas, Longview, Tex., *Supt.*; Bob Mikle, Longview, Tex., *Foreman.* 90 miles, gathering line.

El Dorado Refining Co., Box 551, Eldorado, Kans.

Chas. G. Yankey, *Pres.* T. A. Helling and Robert H. Bradford, *V. P.s;* George J. Peterschmidt, *Sec.*; Robert H. Bradford, *Treas.*; C. G. Anderson, *Supt.* 25 miles, 3 and 4-in.

Empire Pipeline Co., Bartlesville, Okla.

H. R. Straight, *Pres.* and *Gen. Mgr.*; A. W. Ambrose, *V. P.* and *Asst. Gen. Mgr.*; W. A. Sinsheimer and C. E. Murray, *V. P.s;* G. E. Murray, *Sec.*; Lloyd A. Lynd, *Asst. Treas.*; A. N. Horne, *Mgr.*; W. A. Fisher, *Asst. Mgr.*; Harry Nelson, *Budget Engr.*; A. F. Roth, *Ch. Clerk;* Wm. Bayman, Box 149, Ponca City, Okla., *Master Mechanic;* A. E. Stewart, Box 1163, Okla. City, *Ch. Gager;* C. H. Zink, *Ch. Oil Dispatcher; Dist. Supts.:* Thos. Cole, Jr., Box 366, Madison, Kans.; C. A. Mason, Box 12, Oil Hill, Kans.; Thos. J. Lanagan, Box 711, Cushing, Okla.; Joe Ham, Dist. 4, Box 1163, Okla. City; N. G. Moore, Dist. 6, Box 718, Gladewater, Tex.; *Asst. Supts.:* J. W. Fagan, Dist. 3, Box 149, Ponca City, Okla.; P. O. Teter, Dist. 6, Box 718, Gladewater Tex. 823 miles, 2 to 12-in.

Eureka Pipe Line Co., 210 Seneca St., Oil City, Pa.

Allan T. Towl, New York City, *Pres.*; J. M. Tussey and E. W. Macklin, *V. P.s;* E. W. Ziegler, *Sec.*; J. M. Tussey, *Treas.*; E. W. Macklin, Parkersburg, W. Va., *Gen. Mgr.*; M. J. Leonard, Parkersburg, W. Va., *Gen. Supt.*; W. F. Alexander, Mannington, W. Va., *Div. Supt.*; Roy Godfrey, Parkersburg, W. Va., *Div. Supt.* 254 miles, 2 to 10-in. trunk line; 4,095 miles, 2 to 10-in. gathering line.

F

Frontenac Pipe Line Co., Peoples National Bank Bldg., Tyler, Tex.

James A. Wales, *Pres.*; John Warren, *V. P.*; H. B. Morris, *Sec.*; Lucille Mardock, *Treas.*; D. W. Johnson, Kilgore, Tex., *Supt.* 37 miles, 4 and 6-in. gathering lines.

G

General Petroleum Corp. of California, 108 West Second St., Los Angeles, Calif.

A. L. Weil, *Pres.*; R. A. Sperry, B. E. Parsons, S. J. Dickey, A. H. DeFriest, and E. L. Adams, *V. P.s;* D. W. Woods, *Sec.*; W. Cunningham, *Treas.*; J. L. Martin, 2525 East Thirty-seventh St., Vernon, Calif., *Gen. Supt.*; R. F. Kline, Vernon, Calif., *Asst. Gen. Supt.*; F. D. Posey, Vernon, Calif., *Engr.*; W. J. McArthur, Vernon, Calif., *Master Mechanic.* 804 miles, 2 to 8-in.

Glacier Production Co., Box 1338, Butte, Mont.

F. W. Bird, *Pres.*; M. E. Buck, *V. P.*; S. P. Hogan, *Sec.*; J. R. Thomas, *Treas.*; R. D. Smith, *Asst. Gen. Mgr.*; J. E. Hupp, *Field Mgr.* and *Gen. Mgr.*; Robert E. Lee, *Oil Prod. Supt.*; Tom Chew, *Drlg. Supt.*; M. A. Hardie, *Gas Prod. Supt.*; E. M. Parkin, *Ref. Supt.*; H. H. Cochrane, *Chief Engr.* 29 miles, 2 to 8-in.

Gladewater Pipe Line Co., Gladewater, Tex.

C. R. Starnes, *Pres.*; E. L. Ames, *Sec.-Treas.* 30 miles, 3 to 6-in. gathering line.

Globe Pipe Line Co., Union National Bank Bldg., Wichita, Kans.

I. A. O'Shaughnessy, *Pres.*; F. L. Jehle and J. F. O'Shaughnessy, *V. P.s.*; L. W. Dyer, *Sec.* and *Treas.*; F. A. Smalley, *Pipe Line Supt.* 6½ miles, 6 and 8-in.

Golden Bear Oil Co., 325 West Eighth St., Los Angeles, Calif.

J. M. Feldman, *Pres.*; Chas. P. Prewett, *V. P.*; Louis L. Swarthe, *Sec.* and *Treas.*; N. G. Davidson, *Asst. V. P.*; M. B. Pardew, *Asst. Supt.* 17 miles, 6-in.

Grayburg Pipe Line Co., 1419 Smith-Young Tower, San Antonio, Tex.

R. D. Brown, *Pres.*; Claude V. Birkhead and R. D. Brown, Jr., *V. P.s;* Arthur D. Kohler, *Sec.* and *Treas.*; H. T. McDow, Luling, Tex., *Supt.* 22 miles, 2½ and 4-in.

Gulf Refining Co., Gulf Bldg., Pittsburgh, Pa.

F. A. Leovy, *Chm. Bd.*; J. F. Drake, *Pres.*; H. L. Stone, *Exec. V. P.* and *Gen. Counsel;* E. C. Bothwell; W. A. Slater; E. C. Kincade, Houston, Tex.; Rush Greenslade, Tulsa, Okla.; W. V. Hartmann; J. T. Goodman, Shreveport, La.; W. B. Pyron, Houston, Tex.; B. P. Newton, *V. P.s;* H. A. Gidney, *V. P.* and *Comptroller;* J. E. Nelson, *V. P.* and *Treas.*; David Proctor, *Sec.*; L. E. Delcuze, Houston, Tex., *Asst. Sec.*; C. H. Stevens, Houston, Tex., *Asst. Treas.*

Houston Pipe Line Division, P.O. Drawer 2100, Houston, Tex.

N. H. Perry, *Gen. Supt.*; J. L. Irvin, *Asst. Gen. Supt.*; C. M. Rosebrugh, *Ch. Engr.*; W. L. Shannon, *Ch. Dispatcher* and *Gager;* W. H. Cederlof, *Asst. Ch. Dispatcher;* C. C. Perry, *Asst. Ch. Gager;* C. C. Sampson, *Supt., Tel. and Tel.*; L. A. Brauer, Houston, Tex.; F. C. VanCleave, Box 1731, Shreveport, La.; W. F. Rollins, Box 1290, Fort Worth, Tex., *Div. Supts.*; R. C. Sanders, Box 1290, Fort Worth, Tex., *Asst. Div. Supt.*; G. W. Tohline, Drawer 2100, Houston, Tex.; F. L. Benthall, Box 59, Lufkin, Tex.; L. L. Kincade, Box 1731, Shreveport, La.; E. Jones, Box 1290, Fort Worth, Tex., *Master Mechanics;* G. W. Herrington, Box 1731, Shreveport, La., *Foreman, Carpenter;* W. B. Adams, Box 338, Sour Lake, Tex.; J. A. Brown, Box 98, Mooringsport, La.; J. A. Carnahan, Dubberly, La.; C. C. Chambers, Box 488, Roscoe, Tex.; Guy Crisman, Box 758, Overton, Tex.; C. E. Hanratty, Box 567, Goose Creek, Tex.; F. K. Irwin, Box 1618, Vinton, La.; B. H. Jenkins, Box 1203, Houston, Tex.; C. G. Johnson, Box 1681, Beaumont, Tex.; E. F. McEntyre, Box 747, Fort Worth, Tex.; W. H. Parr, Box 1109, Borger, Tex.; J. W. Pyron, Box 809, Odessa, Tex., *Dist. Foremen;* W. N. McGyer, Buras, La., *Asst. Dist. Foreman;* W. B. Melton, Drawer 2100, Houston, Tex., *Foreman, Lineman;* R. M. Pyron, Box 1232, Beaumont, Tex., *Machine Shop Foreman;* Clyde Hayes, Box 1232, Beaumont, Tex., *Asst. Machine Shop Foreman;* C. G. Brandt, Box 1001, Port Arthur, Tex.; J. E. Clifton, Saltillo, Tex.; W. T. Denard, Box 59, Lufkin, Tex.; E. R. Martin, Chester, Tex.; H. A. Vancleave, Box 8, Wortham, Tex.; Rex Ward, Henderson, Tex., *Pump Station Foremen;* W. M. Boyd, Box 338, Sour Lake, Tex.; W. H. Deprang, Route No. 3, Jefferson, Tex.; J. S. Fowler, Box 98, Timpson, Tex.; T. E. Harris, Grandview, Tex.; J. W. Holt, Jr., Box 1681, Beaumont, Tex.; J. F. Nixon, Box 809, Odessa, Tex.; L. G. Pittman, Hobby, Tex.; J. R. Ross, Route No. 3, Box 63, Weatherford, Tex.; G. W. Thompson, Box 488, Roscoe, Tex.; T. L. Thompson, Box 159, Ranger, Tex.; R. Walker, Box 85, Coahoma, Tex.; L. R. Woodall, Box 78, Clyde, Tex., *Running Ch. Engineers.* 3,906 miles.

Tulsa Pipe Line Division, P.O. Box 661, Tulsa, Okla.

J. R. Murphy, *Gen. Supt.*; P. L. Reichard, *Asst. Gen. Supt.*; Arthur Ray, *Div. Supt.*; F. E. Hart and H. L. Rearick, *Asst. Div. Supts.*; H. G. Bard, *Ch. Dispatcher;* R. E. Trumbull, *Master Mechanic;* Harry Jones, *Supt., Tel. and Tel. Dept.*; Tom Ryan, Box 385, Jenks, Okla., *Supt., Tank Construction;* E. M. Dalton, Box 1187, Drumright, Okla.; A. H. Detrie, R.F.D. No. 1, Kaw, Okla.; J. B. Heard, Box 1667, Hobbs, N. M.; Arch Miller, Box 795, Frederick, Okla.; C. H. Estes, Box 632, Seminole, Okla., *Dist. Foremen;* E. E. Swanson, R.F.D. No. 1, Box 167-A, Cambridge City, Ind.; T. C. Carlisle, Box 216, Pawnee, Okla.; J. J. Vaughn, Box 116, Jenks, Okla.; P. R. Swinney, Box 990, Henryetta, Okla.; Gus Mager, Box 193, McAlester, Okla., *Pump Station Foremen;* K. S. Slagle, R.F.D. No. 2, Box 64, Pryor, Okla.; W. M. Prather, R.F.D. No. 2, Box 112, Anderson, Mo.; W. A. Hopson, R.F.D. No. 1, Box 171-A, Monett, Mo.; H. D. Key, R.F.D. No. 2, Box 89-G, Springfield, Mo.; H. B. McCullough, Gen. Del., Nebo, Mo.; C. B. Flippo, Star Route, Steeleville, Mo.; C. H. Morrison, Box 56, Valmeyer, Ill.; Oliver Forbes, R.F.D. No. 1, Breese, Ill.; G. H. Crawford, R.F.D. No. 1, Box 130, Edgewood, Ill.; W. L. Berry, R.F.D. No. 2, Hutsonville, Ill.; R. H. Gray, R.F.D. No. 1, Poland, Ind.; J. C. Brown, R.F.D. No. 1, Box 187, Greenwood, Ind., *Running Ch. Engineers.* 1,896 miles. (5,802 miles, Houston and Tulsa Divisions.)

H

Hancock Oil Co. of California, 2828 Junipero Ave., Long Beach, Calif.

Will J. Reid, *Pres.*; George P. Dean, *Exec. V. P.*; Ernest E. Pyles, *V. P., Chg. Prod.*; John W. Hancock, *Sec.*; W. T. Hancock, *Treas.*; Lloyd C. De Harte, *Pipe Line Supt.*; John R. Eidom, Berth 215, Terminal Island, Calif., *Marine Terminal Supt.*; H. T. Boehme, *Engr. in Chg. Maintenance and Construction;* Joseph L. Murray, *Yard Foreman;* James W. Edwards, *Shipping Foreman;* Arthur E. Williamson, *Operating Foreman;* F. LaVerne Smith, *Ch. Chem.*; George Arnold, *Prod. Supt.*; Gerald B. Rusk, *Asst. Prod. Supt.*; Walter Bell, Rt. 5, Box 257, Bakersfield, Calif., *Prod. Foreman.* 49 miles, 8-in.

Humble Pipe Line Co., P.O. Drawer 2220, Houston, Tex.

R. V. Hanrahan, *Pres.*; J. A. Neath, *V. P.* and *Gen. Supt.*; C. D. Voss, *Treas.*; J. M. Monaghan, *Sec.* and *Asst. Treas.*; N. V. Truly, *Comptroller;* S. G. Loy, *Auditor;* O. Q. Lomax, *Asst. Gen. Supt.*; H. M. Stevenson, *Ch. Engr.*; A. E. Pecore, *Asst. Ch. Engr.*; J. C. Robertson, *Civil Engr.*; H. M. Lingle, *Pur. Agt.*; R. M. Bayless, *Supt. Tel. and Tel.*; Gus Kellogg, *Supt. Rt.-of-Way and Claim Dept.*; J. B. Harvey, *Tank Supt.*; Carl J. Smith, *Paint Supt.*; E. D. Brown, *Welding Supt.*; J. W. Holtz *Master Mech.*; F. L. Statler, *Ch. Warehouseman;* F. L. Newton, League City, Tex., *Constr. Foreman; Div. Supts.:* F. D. McMahon, Longview, Tex.; J. W. Thomas, Midland, Tex.; J. C. Hanrahan, Cisco, Tex.; W. L. Howard, Corpus Christi, Tex.; T. R. Hanrahan, Houston; *Asst. Div. Supts.:* G. A. Lee, Midland, Tex.; W. P. Guinn, Houston; *Dist. Foremen:* F. O. Perry, Hull, Tex.; J. I. Anderson, Baytown, Tex.; M. C. Foley, Longview, Tex.; W. A. Hugg, Corpus Christi; J. L. Van Pelt, Talco, Tex.; G. N. Irvine, McCamey, Tex.; J. A. Griffin, Odessa, Tex.; J. C. Jones, Pampa, Tex.; J. E. Caffrey, Cisco, Tex.; I. F. Pettey, Luling, Tex.; G. W. Oliver, Benavides, Tex.; M. L. McGannon, Mexia, Tex. 7,325 miles.

Huso Brothers, Ferdig, Mont.

E. R. Huso, *Pres., Sec.* and *Treas.*; J. A. Huso, *V. P.* 6½ miles, 2-in.

I

Illinois Pipe Line Co., 539 South Main St., Findlay, Ohio.

Charles Bunje, Jr., *Pres.*; P. W. Hennessy and O. F. Moore, *V. P.s.*; O. F. Moore, *Sec.*; C. H. Gompf, *Treas.*; A. B. Johnson, *Ch. Engr.*; F. H. Warren, *Asst. Ch. Engr.*; S. S. Richards, *Pur. Agt.*; *Gen Supts.:* E. C. Welch, Bridgeport, Ill.; R. N. Montgomery, Houston, Tex.; *Supts.:* O. M. Jaco, Martinsville, Ill.; P. E. Thompson, Lima, Ohio; W. A. Montgomery, Iraan, Tex.; B. E. Rigby, Ranger, Tex.; E. H. Perry, Arp, Tex.; R. M. Sackett, Casper, Wyo.; J. W. Cumming, Shelby, Mont.; H. C. Warters, Robinson, Ill., *Foreman;* R. M. Slouth, *Supt. of Communications.* 4,586 miles.

Imperial Pipe Line Co., Ltd., 56 Church St., Toronto, Ont., Canada

G. H. Smith, *Pres.*; J. R. Simpson, *V. P.* and *Gen. Mgr.*; L. C. McCloskey, *Dir.*; W. J. Whitling, *Sec.-Treas.* 8 miles, 6 and 8-in.

Indiana Pipe Line Co., Huntington, Ind.

H. A. Somers, Jr., *Gen Mgr.*; G. L. Robinson, *Supt.*; C. D. Hall, *Asst. Sec.*; F. A. McClelland, *Oil Dispatcher.*

International Pipe Line Co., P.O. Box 2332, Houston, Tex.

C. E. Olmsted, *Pres.*; R. L. Saunders, *Sec.*; L. H. Lindeman, New York, *Treas.*; H. S. McCray, Sunburst, Mont., *Supt.* 28 miles, 60 miles gathering line.

K

Kanotex Refining Co., Arkansas City, Kans.

C. M. Boggs, *Pres.*; W. L. Lesh, *V. P.*; E. K. Childers, *Sec.*; R. R. Cox, *Treas.*; L. E. Watts, *Pur. Agt.*

Kaw Pipe Line Co., P.O. Box 2332, Houston, Tex.

B. E. Hull, *Pres.*; J. K. McGoldrick, *V. P.* and *Gen. Mgr.*; E. F. Guidinger and A. N. Horne, *V. P.s;* H. L. Stewart, *Sec.* and *Treas.* 546 miles.

Kendall Refining Co., Bradford, Pa.

Otto Koch, *Pres.;* J. B. Fisher, *Exec. V. P.;* Joseph H. Bovaird, *V. P.;* J. B. Fisher, *Sec.;* Otto Koch, *Treas.;* W. M. Magee, *Pipe Line Supt.;* H. L. Mills, *Gen. Foreman.* 99 miles, 2 to 6-in.

L

Leonard Pipe Line Co., Box 323, Mount Pleasant, Mich.

J. W. Leonard, *Pres.;* David E. Beach, *V. P.;* Grant L. Cook, *Sec.;* B. M. Jones, *Treas.;* R. R. Bloomer, *Supt.;* Frank Baker, *Asst. Supt.* 85 miles, 4 and 6-in.

Lion Oil Refining Co., Exchange Bldg., El Dorado, Ark.

Col. T. H. Barton, *Pres.;* T. M. Martin, A. F. Reed, J. J. Allinson, and J. E. Howell, *V. P.s;* Jeff Davis, *Sec.;* R. E. Meinert, *Treas.;* J. E. Howell, *Chg. of Prod. and Pipe Lines;* E. W. Hardage, *Gen. Supt. Prod. and Pipe Lines;* Joe B. Tims, *Pipe Line Supt.;* J. D. Kendrick, *Ch. Gauger;* V. M. Speer, *Pipe Line Connection Foreman;* J. L. Nutt and J. D. Herring, *Pump Repairmen;* L. O. Preddy, J. E. Coley, Sr., and V. E. Vaulbree, *Station Engrs.;* J. L. Greene, El Dorado district, *Gager;* D. C. Ellen, Schuler district, *Gager.* 224 miles, 2 to 12-in.

Live Oak Gas Co., Three Rivers, Tex.

Henderson Coquat, *Pres.;* A. F. Moore, *V. P.;* J. K. Montgomery, *Sec.;* Ralph Robinson, *Sales Mgr.* and *Comptroller.* 6 miles, 4-in.

Loudon Pipeline Co., Pana, Ill.

S. D. Jarvis, *Pres.;* C. Hayden Davis, *V. P.;* Russell House, *Sec.;* L. C. Kesler, *Oper. Supt.* 30 miles.

M

Magnolia Pipe Line Co., P.O. Box 900, Dallas, Tex.

D. A. Little, *Pres.;* L. S. Sinclair, J. L. Latimer, Wallace Hawkins, M. J. McLaughlin, George Miller and John W. Newton, *V. P.s;* Guy L. Tate, *Sec.;* W. L. Holmes, *Treas.;* L. H. True, *Asst. Mgr.;* O. D. Stallard, *Supt. Central Div.;* A. R. Ehrhardt, *Supt. Maintenance;* A. J. Balcom, *Gen. Supt. Tel. and Tel. Dept.;* J. W. Hale, *Asst. Gen. Supt. Tel. and Tel. Dept.;* H. H. Watson, *Supt. Tel. and Tel. Dept.;* D. H. Levy, *Electrical Engr. Tel. and Tel. Dept.;* L. E. Adler, *Engr. Tel. and Tel. Dept.;* J. G. Norton, *Ch. Mech. Engr.;* F. P. Childress, *Ch. Oil Dispatcher;* Don R. Gladney, *Supt. Rt.-of-Way and Claim Dept.;* George T. Jackson, *Supt. Welders;* E. A. Koenig, *Corrosion Engr.; Dist. Supts.;* C. E. Still, Dallas; H. F. Smith, Box 1232, Electra, North Texas; F. D. Breedlove, Box 1073, Midland, Tex., West Texas; L. A. Hancock, Box 1909, Longview, Tex., East Texas; C. R. Swank, Box 1406, Shreveport, La., La. and Ark.; J. E. McGeath, Box 2121, Houston, Tex., Southern; J. H. Joy, Box 2121, Houston, Tex., Tomball; H. C. Alton, Box 150, Alice, Tex., Southwest Texas; R. W. Stewart, Box 550, Luling, Tex., Luling; J. A. Smith, Box 29, Olden, Tex., Olden; A. T. Glover, Box 1828, Oklahoma City, Okla., Northern; V. L. Red, Box 1828, Oklahoma City, Okla., Cushing-Oklahoma City; O. M. Joy, Box 1261, Wewoka, Okla., Wewoka; H. M. Van Buskirk, Box 368, Healdton, Okla., Healdton; A. W. Frey, Box 618, Corsicana, Tex., *Supt. Maintenance; Foremen:* C. C. Coffindoffer, Box 1406, Shreveport, La., La. and Ark.; C. R. Fitch, Box 1073, Midland, Tex., West Texas; *Ch. Gagers:* E. M. Phillips, Box 1828, Oklahoma City, Okla., Okla. Div.; N. J. Jacobi, Box 1232, Electra, Tex., Central Div.; D. R. Ford, Box 1909, Longview, Tex., Central Div.; M. E. Powell, Box 150, Alice, Tex., Southern Div.; E. A. Volts, Box 1828, Oklahoma City, Okla., *Gen. Foreman Tel. and Tel. Dept.* 3,834 miles, 4 to 12-in.

M-A-R Pipe Line Co., P.O. Box 1500, Corpus Christi, Tex.

Dan D. Rogers, *Pres.;* T. E. McArdle, *V. P.* and *Gen. Mgr.;* C. Andrade, III, *V. P.;* Jenks Smith, *Sec.;* C. M. Hall, *Treas.;* H. E. Tyson, *Supt.* 43 miles, 6-in. trunk line; 40 miles, 4-in. gathering line.

Mason Pipe Line Co., P.O. Box 392, Pecos, Tex.

O. M. Mason, *Pres.;* A. D. Marmaduke, *Sec.;* H. H. Griffin, *Treas.;* Hugh M. Herbert, *Supervisor.* 11 miles, 4-in. operated by Helmerich & Payne, Tulsa.

Michigan-Toledo Pipe Line Co., P.O. Box 297, Mount Pleasant, Mich.

C. L. Maguire, *Pres.;* William L. Davis, *V. P.;* S. M. Fasquelle, *Sec.;* H. J. Chopard, *Treas.;* D. Y. Hewitt, *Gen. Supt.;* N. Blundell, *Ch. Engr.;* J. E. Parkhurst. *Maintenance Engr.* 299 miles, 6 and 8-in.

Mid-Continent Pipe Line Co., Mid-Continent Petroleum Corp. Bldg., Tulsa, Okla.

Jacob France, *Pres.;* G. O. Moody, *V. P.;* J. A. Beyhan, *Gen. Supt.;* Chas. Klein, *Sec.-Treas.;* J. M. Linehan, *Asst. to Gen. Supt.;* Fred E. Pyeatt, Jr., *Ch. Engr.;* H. D. Bennett, *Supt. Tel. and Tel.;* J. T. Meador, *Ch. Dispatcher;* G. R. Haley, *Ch. Clerk;* J. P. Koons, *Ch. Gager; Dist. Foremen:* J. P. Ellis, Rt. 1, Weleetka, Okla.; H. H. Thompson, Box 381, Tulsa; W. C. Wren, Box 448, Hominy, Okla.; W. A. Smith. Box 272, Drumright, Okla. 1,198 miles, 2 to 10-in.

Mountain States Gas Co., 35 East Wacker Drive, Chicago, Ill.

D. D. Irwin, *Pres.;* Henry Hauseman and H. J. Lowe, *V. P.s;* C. H. Jay, *Sec.-Treas.;* J. H. Botkin, *Comptroller;* D. E. Sullivan, *Ch. Engr.;* J. A. Waggoner, Dawes, W. Va., *Gen. Mgr.;* C. V. Conner, Cabin Creek, W. Va., *Supt.* 38 miles, 2 to 6-in.

Moutray Oil Co., Sixth and Pine, Abilene, Tex.

E. W. Moutray, *Pres.;* L. P. Kirk, *V. P.;* Vera Middleton, *Sec.;* M. P. Moutray, *Treas.;* Lee Walker, *Pipe Line Operator.* 3 miles, 3-in.

Muenster Refining Co., Muenster, Tex.

Tom E. Hopson, *Receiver.* 5 miles, 2 to 4-in.

Murchison & Closuit, Inc., 1904 Alamo National Bldg., San Antonio, Tex.

T. F. Murchison, *Pres.;* E. M. Closuit, *V. P.;* Nelson P. Wimberly, *Sec.-Treas.;* Dale Thomas, *Supt.* 40 miles, 4½-in.

N

National Refining Co., Hanna Bldg., Cleveland, Ohio.

Paul Ryan, *Pres.;* Louis S. Pierce, *Sec.;* G. M. Taylor, *Mgr.;* O. W. Gosnell, 304 Kaufman Bldg., Wichita, Kans., *Prod. Supt.;* William Jack, Box 1000, Bartlesville, Okla., *Supt. of Pipe Lines.* 809 miles, 2 to 6-in.

National Transit Co., 206 Seneca St., Oil City, Pa.

D. M. Sachs, *Pres.;* J. H. Contino, *V. P.;* F. G. Zimmerman, *Sec.;* J. H. Contino, *Treas.;* E. H. Fortmann, *Gen. Mgr.;* S. D. Osborne, *Oil Traf. Dispatcher;* M. W. Robinson, *Valuation Engr.;* C. L. Guignon, Warren, Pa., *Supt.;* J. A. Carlson and C. R. Tompsett, *Foremen;* George Galmish, Butler, Pa., *Supt.* 3,450 miles, 2 to 12-in.

New Mexico Pipe Line Co., Ponca City, Okla.

W. H. Ferguson, *Pres.;* W. W. Bruce and Martin Yates, Jr., *V. P.s;* C. F. Smith, *Sec.-Treas.;* J. G. Dyer, *Mgr.;* Neil Stallard, Texon, Tex., *Supt.* 71 miles, 2 to 6-in.

New York Transit Co., Olean, Cattaraugus County, New York.

M. H. Lamb, *Dist. Foreman.*

Northern Group Pipe Lines (comprising Indiana Pipe Line Co., Buckeye Pipe Line Co., Northern Pipe Line Co. and New York Transit Co.), offices at 26 Broadway, New York, N. Y.

D. S. Bushnell; P. R. Applegate, *Pres.;* J. H. Peper, *V. P.* and *Ch. Engr.;* H. D. Bushnell, *Gen. Counsel;* J. R. Fast, *Sec.;* C. H. Cleaver, *Treas.;* A. B. Oakes, *Mgr. Real Estate and Tax Div.;* R. J. Beatty, *Freight Traffic Mgr.;* O. L. Nahouse, *Pur. Agt.;* E. M. Welsh, *Oil Traffic Mgr.;* W. H. Flann, *Supt. of Tel.,* 206 Seneca St., Oil City, Pa.

Northern Pipe Line Co., 206 Seneca St., Oil City, Pa.

J. A. Bartlett, *V. P. and Gen. Mgr.;* J. P. Blackford, *Asst. Sec.*

Norwalk Co., The, 634 South Spring St., Los Angeles, Calif.

Lionel T. Barneson, *Pres.;* H. J. Barneson, J. L. Barneson, *V. P.s;* W. E. Kropp, *Sec.;* K. E. Grigsby, *Gen. Supt.;* E. C. Spencer, *Plant Supt.;* G. C. Mintler, *Ch. Gager;* A. E. Seivi, *Construction Foreman.* 18 miles, 4 and 6-in.

Nueces Pipe Line Co., Heep Bldg., Corpus Christi, Tex.

J. L. Sullivan, *Pres.;* G. E. Sullivan, *V. P.;* B. K. S. Garnett, *Sec.-Treas.;* I. J. Alexander, *Supt.* 15 miles, 3 and 4½-in.

O

Oklahoma Pipe Line Co., Box 801, Tulsa, Okla.

W. R. Finney, *Pres.;* Paul Griffin, *V. P.;* H. P. Hellinghausen, *Sec.;* Paul Griffin, *Treas.;* Bruce Ramsey, *Gen. Supt.;* A. E. Erickson, *Asst. to Supt.;* Reece Henry, Box 750, Wewoka, Okla., *Dist. Supt.;* George B. Randels, Box 500, St. Elmo, Ill., *Dist. Supt.;* H. S. Foote, *Ch. Oil Dispatcher;* George S. Bancroft, Box 750, Wewoka, Okla., *Dist. Foreman;* E. E. Fuller, Box 972, Wilson, Okla., *Mech. Foreman;* John R. Miller, Box 500, St. Elmo, Ill., *Mech. Foreman; Field Foremen:* G. C. Pollard, Box 750, Wewoka, Okla.; Claude A. Goodin, Box 967, Wilson, Okla.; John D. Bowers, Box 500, St. Elmo, Ill.; F. E. Warterfield, Jr., *Ch. Engr.* 994 miles trunk lines; 381 miles gathering lines.

Olney Oil & Refining Co., 1111 City National Bldg., Wichita Falls, Tex.

C. W. Cahoon, Jr., *Pres.* and *Treas.;* C. M. Crowell, *Sec.;* J. P. Slater and J. L. Cozart, *Operating Personnel.* 10 miles, 2 and 4-in.

Onyx Refining Corp., Box 330, Abilene, Tex.

O. B. Stephum, *Pres.;* C. J. Powell, *V. P.;* J. B. Self, *Sec.-Treas.;* J. H. Lantz, *Supt.;* O. D. Bryon, *Asst. Supt.* 8 miles, 3-in.

Osage Trust, Osage, Wyo., and Chadron, Neb.

Edwin D. Crites, Box 1276, Chadron, Neb., *Sole Trustee;* H. E. Reische, *Sec.;* C. F. Coffee, Jr., *Treas.;* E. B. Jones, Osage, Wyo., *Gen. Mgr.;* H. T. Thorson, Osage, Wyo., *Gen. Supt.* 3½ miles, 4-in.

P

Pan American Pipe Line Co., 122 East Forty-second St., New York, N. Y.

Robert E. Wilson, *Pres.;* E. G. McKeever, J. A. Carroll, Jr., and E. R. Turner, *V. P.s;* D. H. Baker, *Sec.,* J. A. Carroll, Jr., *Treas.;* O. H. Powell, *Gen. Supt.;* E. V. Hewitt, *Gen. Supt. Cayuga Field;* H. E. McKinley, *Cayuga Field Supt.* 162 miles, 2 to 12-in.

Panola Pipe Line Corp., 1608 Santa Fe Bldg., Dallas, Tex.

H. L. Hunt, *Pres.;* J. S. Loftin, Jr., *V. P.;* Roy Lee, *Sec.-Treas.* 24 miles, 2 to 4-in.

Pasotex Pipe Line Co., 225 Bush St., San Francisco, Calif.

A. S. Russell, *Pres.;* M. E. Lombardi and J. H. Tuttle, *V. P.s;* B. W. Letcher, *Sec.;* G. J. O'Brien, *Treas.;* E. H. Todd, El Paso, Tex., *Gen. Mgr.;* A. W. Gleason, El Paso, Tex., *Supt.* 221 miles, 3 to 8-in. trunk lines; 27 miles, 4 to 8-in. gathering lines.

Pettus Oil & Refining Co., Pettus, Tex.

Morris Roberts, *Pres.;* W. D. Walton, *V. P.;* George A. Ray, Jr., *Sec.-Treas.;* D. C. Roberts, *Gen. Mgr.,* T. R. Hofius, *Supt.;* E. G. Boyle, *Auditor.* 10 miles, 2-in.

Pioneer Oil & Refining Co., 604 Carolina St., San Antonio, Tex.

A. B. Slimp, *Pres.;* C. A. Slimp, *V. P.;* F. B. Sloan, *Sec.;* F. A. Slimp, *Treas.;* J. E. Dismukes, *Supt.,* George Barnes, *Foreman.* 28 miles, 3 and 4-in.

Potter Brothers Pipe Line Co., Inc., Drawer 272, Kilgore, Tex.

Tom Potter, *Pres.;* Julian Potter, *V. P.;* George S. Reed, *Auditor;* J. H. Fleming, *Supt.;* E. F. Marshall, *Station Engr.*

Premier Oil Refining Co. of Texas, Box 1512, Longview, Tex.

Sylvester Dayson, *Pres.;* Sam W. Ross, *V. P.;* R. P. Hargis, *Sec.-Treas.;* John G. Sullivan, Laird Hill, Tex., *Ch. Gager East Tex. Div.;* F. C. Peters, Cotton Valley, La., *Ch. Gager Cotton Valley Div.;* W. T. Reed, *Gen. Supt.* 35 miles, 2 to 6-in.; 13 miles, 4-in. leased.

Pure Oil Pipe Line Co. (Pennsylvania), 35 East Wacker Drive, Chicago, Ill.

D. D. Irwin, *Pres.;* Henry Hauseman, *V. P.;* C. H. Jay, *Sec.-Treas.;* J. H. Botkin, *Comptroller;* E. A. McCadden, Marcus Hook, Pa., *Supt.;* D. E. Sullivan, *Ch. Engr.* 57 miles, 6 and 8-in.

Pure Transportation Co., 35 East Wacker Drive, Chicago, Ill.

D. D. Irwin, *Pres.;* Henry Hauseman and G. C. Morris, *V. P.s;* C. H. Jay, *Sec.-Treas.;* J. H. Botkin, *Comptroller;* D. E. Sullivan, *Ch. Engr.; Supts:* R. H. Parr, Van, Tex.; H. C. Christman, Lake Charles, La.; J. F. Miller, Mount Pleasant, Mich.; C. L. Bernard, Tulsa, Okla.; R. E. Young, Tulsa, Okla., *Mgr. Oklahoma lines;* G. C. Morris, Beaumont, Tex., *Mgr. Texas and Louisiana lines.* 285 miles, 4 to 12-in. trunk lines; 496 miles gathering lines.

R

Reagan County Purchasing Co., Inc., 1610 Fair Bldg., Fort Worth, Tex.

Barney Holland, *Pres.;* D. A. Richardson, *V. P.;* R. L. Roberts, *Sec.-Treas.;* Neil Stallard, *Dist. Supt.*

Republic Pipe Line Co., 806 Second National Bank Bldg., Houston, Tex.

O. D. Robinson, *Pres.;* D. W. Hovey and D. D. Johnson, *V. P.s;* William H. Moreland, *Sec.-Treas.;* G. E. Casey, 909 Nixon Bldg., Corpus Christi, Tex., *Supt.* 32 miles, 4 and 6-in.

Richfield Oil Corp., 555 South Flower St., Los Angeles, Calif.

H. F. Sinclair, *Chm. Bd.;* W. Alton Jones, *Chm., Finance Committee;* Charles S. Jones, *Pres.;* F. A Morgan, W. T. Dinkins, and A. M. Kelley, *V. P.s.* M. Richard Cross, *Treas.;* W. T. Autrey, *Comptroller;* Cleve B. Bonner, *Sec.;* E. B. Downey, *Asst. Sec.-Treas.;* Leonard Switzer, *Asst. Sec.;* A. H. B. Gore, Box 470, Long Beach, Calif., *Pipe Line Supt.:* Gordon B. Slater, Box 107, Lebec, Calif., *Pipe Line Div. Foreman;* E. T. Smith, Box 470, Long Beach, Calif., *Pipe Line Engr.;* L. A. Wilson, Long Beach Calif., *Pipe Line Field Engr.;* William Hoffman, Long Beach, Calif., *Pipe Line Construction Foreman.* 395 miles, 2 to 12-in. (including 16 miles leased).

Rusk Oil & Refining Co., Peoples National Bank Bldg., Tyler, Tex.

H. H. Coffield, *Pres.;* George P. Mann, *V. P.;* J. H. Edwards, *Sec.;* C. A. Porter, *Supt.* 12 miles.

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On the industrial map of America, one finds an organization which seems, in its management and operation, to interpret completely the spirit and traditions of the industry it serves.

In the pipe line field, Dempsey-Wilson have in five short months, secured a place of leadership. It is with pride and a sincere feeling of appreciation that we assume this responsibility . . . pride in jobs well done . . . and appreciation for the confidence of the many firms who have selected us to build their pipe lines.

Thirty-four years of building pipe lines are a good many years, but this figure represents the combined experience of our Mr. O. E. Dempsey and Mr. Loy Wilson. No doubt this, and the fact that Dempsey-Wilson's equipment is all new and of latest design, have influenced the contracts awarded us.

We therefore, invite you to consider Dempsey-Wilson, when "letting" your next pipe line contract. We are sure that you will not be disappointed.

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HOLLAND CONSTRUCTION CO.

H. T. HOLLAND, JR.

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S

Scurlock Oil Co., 927 Bankers Mortgage Bldg., Houston, Tex.

E. C. Scurlock, *Pres.;* Dr. E. T. Clark, *V. P.;* W. C. Scurlock, *Treas.* 14 miles, 2½-in.

Shell Oil Co., Inc. (Pacific Coast territory), 100 Bush St., San Francisco, Calif.

S. Belither, *Exec. V. P.* and *Chm. Bd.;* F. S. Clulow, D. Heggie, E. F. Davis, C. E. Mott, L. G. McLaren, *V. P.s;* A. R. Bradley, *Asst. Sec.;* J. H. White, *Asst. Treas.;* F. B. Simms, Shell Bldg., Los Angeles, *Mgr.,* W. C. Roberts, Shell Bldg., Los Angeles, *Asst. Mgr.;* M. C. Alcorn, Shell Bldg., Los Angeles, *Dist. Supt.;* E. W. Jenkins, Box 329, Tracy, Calif.; *Dist. Supt.;* H. H. McQueen, Box 329, Tracy, Calif.; *Asst. Dist. Supt.;* F. O. McKeany, Shell Bldg., Los Angeles, *Ch. Dispatcher.* 644 miles, 3 to 12-in.

Shell Pipe Line Corp., Shell Bldg., St. Louis, Mo. (Houston, Tex., after October 1).

R. P. Bascom, *Pres.;* R. B. High, *V. P.;* J. D. Watkins, *Sec.;* W. A. Baker, *Treas.;* D. F. Sears, *Gen. Supt.;* D. H. Lewis, *Ch. Engr.* and *Pur. Agt.;* F. S. Leonard, *Tel. Supt.;* F. G. Embshoff, *Administrative Asst.; Area Supts.:* L. F. Young, Cushing, Okla.; C. C. Ingram, Houston, Tex.; W. H. Shelley, Colorado, Tex. 4,508 miles, 2 to 16-in.

Simrall Corp., P.O. Box 297, Mount Pleasant, Mich.

C. L. Maguire, *Pres.;* William L. Davis, *V. P.;* S. M. Fasquelle, *Sec.;* H. J. Chopard, *Treas.;* D. Y. Hewitt, *Supt.;* N. Blundell, *Ch. Engr.;* Robert Rea, *Dist. Supt.;* T. N. Rutherford, *Asst. Supt.;* Orah Courtney, *Asst. Supt.;* Robert Wood, *Warehouseman;* A. B. Carlisle, *Geologist;* William Haught, *Maintenance Supt.;* C. E. Thorne, *Land Dept.;* Earle Boylen, *Timekeeper.* 165 miles, 2 to 6-in.

Sinclair Refining Co., Pipe-Line Dept., Independence, Kans.

Earle Sinclair, New York City, *Pres.;* C. H. Kountz, Box 460, Independence, Kans., and Judge Edward H. Chambler, Tulsa, Okla., *V. P.s;* J. R. Manion, *V. P.* and *Gen. Mgr.;* Charles Fitzgerald, Box 1990, Fort Worth Tex., and Frank Hadley, *Assts. to V. P.;* M. E. Fannon, Box 418, Tulsa, Okla., *Exec. Dept.;* R. B. Hanna, *Asst. Sec.-Treas.;* K. L. Laufman, *Auditor;* C. R. Weidner, *Ch. Engr.;* J. J. Linehan, Box 418, Tulsa, Okla.; C. E. McPoland, 1412 Commerce Bldg., Kansas City, Mo.; W. R. Reed, A. D. Sloan, Box 1990, Fort Worth, Tex., *Gen. Supts.;* W. E. Morrison, Box 418, Tulsa, Okla.; R. J. Tibbets, 1412 Commerce Bldg., Kansas City, Mo., *Asst. Gen. Supts.;* Leo F. McLaughlin, *Master Mechanic;* D. R. Welch, *Supt., Tel. and Tel.;* H. E. Browne, *Asst. Supt., Tel. and Tel.;* L. H. Angove, Box 350, Bowie, Tex.; C. E. Christie, Box 711, Mexia, Tex.; W. F. Curry, Box 418, Tulsa, Okla.; R. B. Laughner, 414 Bondi Bldg., Galesburg, Ill.; M. J. Loftus; J. D. Mornoney, Box 1249, Bartlesville, Okla.; Frank McFarland, 202 Morris Bldg., Mexico, Mo.; Leo B. Smith, Box 1430, Wichita Falls, Tex.; J. J. Stines, 1412 Commerce Bldg., Kansas City, Mo.; H. Wallender, Box 748, Troup, Tex., *Div. Supts.;* B. N. Adkins, 421 North Morrow St., Drumright, Okla.; D. M. Cox, 601 East Fourteenth St., Ada, Okla.; A. H. Donnewald, 531 First National Bank Bldg., Wichita, Kans.; R. J. Osborn; Dave Rike, Box 418, Tulsa, Okla., *Dist. Foremen.* 10,592 miles.

Skelly Oil Co., Skelly Bldg., Tulsa, Okla.

W. G. Skelly, *Pres.;* C. C. Herndon, W. T. Atkins, H. M. Stalcup, and A. H. Hyden, *V. P.s;* F. T. Hopp, *Sec.-Treas.;* J. F. Nagle, *Exec. Asst.;* S. G. Snyder, Eldorado, Kans., *Supt.;* G. E. Ault, Eldorado, Kans., *Dist. Foreman;* Rex. L. Smith, Eldorado, Kans.; *Supt's. Clerk; Connection Foremen:* H. Wolf, Eldorado, Kans.; S. Cannon, Burrton, Kans.; D. O. Confer, Lyons, Kans.; Harry Wahl, Eldorado, Kans.; L. J. Reed, Madison, Kans.; D. A. Kemmerly, Eldorado, Kans., *Ch. Dispatcher;* J. R. Cummings, Eldorado, Kans., *Sta. Ch. Engr.;* C. E. Manion, Eldorado, Kans., *Asst. Dispatcher;* J. P. Sleeper, Eldorado, Kans., *Asst. Dispatcher.* 396 miles, 4 to 8-in.

Socony-Vacuum Oil Co., Inc., 26 Broadway, New York, N. Y.

John A. Brown, *Pres.;* C. E. Arnott, E. R. Brown, A. F. Corwin, G. V. Holton, and H. F. Sheets, *V. P.s;* William D. Bickham, *Sec.;* Arthur T. Roberts, *Treas.* 5,279 miles trunk lines; 2,596 miles gathering lines (includes subsidiaries carried in separate reports).

Socony-Vacuum Oil Co., Inc., White Eagle Division, Federal Reserve Bank Bldg., Kansas City, Mo.

R. R. Irwin, *Gen. Mgr.;* H. K. Phipps, Wichita, Kans., *Gen. Supt. Crude Pipe Lines;* C. C. Durker, *Gen. Supt. Gasoline Pipe Lines;* L. R. Dickinson, Wichita, Kans.; *Ch. Engr.* 300 miles, 4 to 10-in.

Sohio Pipe Line Co., Midland Bldg., Cleveland, Ohio.

W. T. Holliday, *Pres.;* W. J. Semple, S. A. Swensrud, and J. F. Wilson, *V. P.s;* C. D. Brown, *Sec.;* W. J. Semple, *Treas.;* Frank A. Smith, Brooklyn Station, Mooresville, Ind., *Supt., Eastern Div.;* J. Frank Wilson, Mount Vernon, Ill., *Supt., Western Div.* 791 miles, 6 to 12-in.

Southern Phillips Corp., 411 North Broadway, Corpus Christi, Tex.

Maston Nixon, *Pres.;* K. S. Adams, Clarence M. Brown, and Edward Guidinger, *V. P.s;* I. C. Hatridge, *Sec.;* F. W. Currier, *Treas.;* Henry Winters, *Gen. Supt.;* Joe L. Reed, *Terminal Supt.;* Frank P. Peterson, Jr., *Ch. Engr.* 14 miles, 4½ and 6⅝ in.

Southern Pipe Line Co., 210 Seneca St., Oil City, Pa.

Allan T. Towl, *Pres.;* T. C. Towl and J. M. Tussey, *V. P.s;* E. W. Ziegler, *Sec.;* J. M. Tussey, *Treas.;* T. C. Towl, 808 Chamber of Commerce Bldg., Pittsburgh, Pa., *Gen. Mgr.;* L. J. Vandergrift, Woolworth Bldg., Lancaster, Pa., *Gen. Supt.;* D. L. Thomas, *Asst. Sec.-Treas.;* G. W. Williams, 30 Rockefeller Plaza, New York, N. Y., *Asst. Sec.;* E. W. Ziegler, *Asst. Treas.;* W. R. Daugherty, *Gen. Auditor;* H. C. Dorworth. *Solicitor.*

Southern Pipe Line Corp., 411 North Broadway, Corpus Christi, Tex.

Clarence M. Brown, *Pres.;* Maston Nixon, *V. P.;* I. C. Hatridge, *Asst. V. P.;* F. W. Currier, *Treas.;* Henry Winters, *Gen. Supt.;* Joe L. Reed, *Supt.;* Sam F. Crecelius, *Asst. Supt.;* Cecil Threadgill, *Terminal Gager;* Frank P. Peterson, Jr., *Ch. Engr.* 125 miles, 2 to 6-in.

South West Pennsylvania Pipe Lines, 210 Seneca St., Oil City, Pa.

Allan T. Towl, *Pres.;* T. C. Towl and J. M. Tussey, *V. P.s;* E. W. Ziegler, *Sec.;* J. M. Tussey, *Treas.;* T. C. Towl, 808 Chamber of Commerce Bldg., Pittsburgh, Pa., *Gen. Mgr.;* W. H. Fisher, 220 Washington Trust Bldg., Washington, Pa., *Supt.;* D. L. Jolly, 222 Washington Trust Bldg., Washington, Pa., *Supt. Tankage;* D. L. Thomas, *Asst. Sec.-Treas.;* E. W. Ziegler, *Asst. Treas.;* G. W. Williams, *Asst. Sec.,* W. R. Daugherty, *Gen. Auditor;* H. C. Dorworth. *Solicitor.* 436 miles, 2 to 10-in. trunk lines; 1,349 miles, 2 to 6-in. gathering lines.

Standard Oil Co. of California, 225 Bush St., San Francisco, Calif.

H. D. Collier, *Pres.;* R. K. Davies, M. E. Lombardi, and A. S. Russell, *V. P.s;* J. H. Tuttle, *Sec.;* G. J. O'Brien, *Treas.* 207 miles, 6 to 12-in.

Standard Oil Co. of Louisiana, Baton Rouge, La.

M. J. Rathbone, *Pres.;* S. W. Day, *V. P. Chg. Pipe Line Operations;* J. A. Kunkle, Box 1107, Shreveport, La., *Supt.;* S. R. Simmons, Box 1107, Shreveport, La., *Asst. Supt.;* W. B. Fulton, Box 1107, Shreveport, La., *Ch. Engr.;* W. C. Taylor, Box 1107, Shreveport, La., *Pur. Agt.;* F. Coryell, Box 1107, Shreveport, La., *Master Mechanic; Dist. Foremen:* G. C. Rives, Vivian, La.; O. C. Day, Smackover, Ark.; T. F. Welsh, Rt. 5, Box 121, Minden, La.; R. E. Hughes, Oxford, La.; S. A. Sheppard, Sunset, La. 1,928 miles, 2 to 12-in.

Standish Pipe Line Co., Bartlesville, Okla.

E. F. Guidinger, *Pres.;* J. R. Harris, *V. P.;* B. F Stradley, *Sec.;* R. M. Higgins, *Treas.; Supts.:* R. T Conwell, Rt. 9, Box 190, Oklahoma City.; E. V. Kile, Thrall, Kans.; E. A. Ralston, Box 778, Phillips, Tex.; *Dist. Foremen:* W. H. Wallace, Rt. 9, Box 190, Oklahoma City; G. H. Kuepker, Box 121, Shidler, Okla.; C. J. Turner, Rt. 6, Box 90-A, El Dorado, Ark.; D. R. Holloman, Box 778, Phillips, Tex. 1,150 miles. 2 to 10-in.

Stanolind Pipe Line Co., Philcade Bldg., Tulsa, Okla.

A. W. Peake, *Chm. Bd.;* R. S. Ellison, *Pres.;* E. G. Seubert and B. P. Sibole, *V. P.s;* A. L. Carlson, *Sec.-Treas.;* William G. Heltzel, *Gen. Supt.;* C. M. Scott, Jr., *Ch. Engr.;* J. L. Shoemaker, *Auditor;* J. L. Burke, *Traf. Mgr.;* H. R. Swift, *Supt. Right-of-Way;* J. B. Harshman, *Master Mechanic;* J. J. Boyd, *Asst. Ch. Engr.;* A. M. Hill, *Supt. Welding and Line Maintenance;* F. P. O'Connor, *Supt. Tel. and Tel.;* Ray Harvey, *Ch. Oil Dispatcher;* Bert Martin, *Ch. Gager;* R. L. Rowland, *Asst. to Gen. Supt.;* L. E. Jennings, *Personnel Supervisor;* J. C. Stirling, *Corrosion Engr.; Supts.:* O. H. Powell, Fort Worth, Tex.; G. E. Ogilvie, Tulsa; C. W. Butler, Kearney, Neb. 7,236 miles, 2 to 14-in.

Stewart, Maco & Son, 207 Guaranty Bldg., Galveston, Tex.

Paul B. Wittman, *Supt.;* Maco Stewart, Jr., *Mgr.* 5 miles, 6-in.

Sun Pipe Line Co. (Illinois), 1608 Walnut St., Philadelphia, Pa.

J. Edgar Pew, *Pres.;* J. N. Pew, Jr., *V. P.;* Frank Cross, *Sec.-Treas.* 15 miles, 3 to 6-in.

Sun Pipe Line Co. (Texas), San Jacinto Bldg., Beaumont, Tex.

J. Edgar Pew, *Pres.;* J. N. Pew, Jr., and R. W. Pack, *V. P.s;* Frank Cross, *Sec.-Treas.;* A. C. DeWoody, *Supt.;* E. L. Meley, *Asst. Supt.;* William C. Kinsolving, *Supt. E. Texas Div.* 191 miles, 6 and 8-in. trunk line; 342 miles gathering lines.

T

Talco Pipe Line Co., P.O. Box 1011, Mount Pleasant, Tex.

J. F. Lucey, *Pres.;* Toddie L. Wynne and Ralph E.

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When the Going
GETS TOUGH!

SPEED, regardless of how big the pipe or how rough the terrain, is the aim of every man on a WHITAKER job—an aim second only to dependable, first-class construction. That's why experience and the latest equipment has set recent records: 4 miles of 18" firing line in 7 hours 45 minutes . . . 33,000 feet of 6" stove-piped in 7 hours 15 minutes . . . 111 miles of 8" in 22 working days. Ask any body for whom WHITAKER has layed a line—and they'll tell you, "You can depend on WHITAKER to push a job through!"

PICTURES No. 1—Cutting a 36" ditch in Louisiana; No. 2—Laying 18" line through Louisiana swamps; No. 3—8" river crossing in Oklahoma; No. 4—Electric welding 18" pipe in Mississippi; No. 5—10" sidebend in Kansas (average of 8,000 feet daily); No. 6—Reconditioning old 12" Teapot-Dome line in Nebraska to be re-laid.

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Tulsa, Oklahoma

Fair, *V. P.s;* Joe Dranguet, *Sec.-Treas.;* L. A. Kendrick, *Auditor.* 74 miles, 4 to 8-in.

Taylor Petroleum Co., Taylor, Tex.

G. L. Rowsey, *Pres.;* William C. McTarnahan, *V. P.;* Harris A. Melasky, *Sec.-Treas.;* W. R. Arrington, *Asst. Treas.;* J. H. Wells, Corpus Christi, Tex., *Supt.;* W. W. Wallace, Corpus Christi, Tex., and R. R. Buttler, Corpus Christi, Tex., *Asst. Supts.* Gathering system only.

Texas-Empire Pipe Line Co., P.O. Box 2332, Houston, Tex.

B. E. Hull, *Pres.;* A. N. Horne, *V. P.;* F. A. Stivers, *V. P.* and *Gen. Supt.;* H. L. Stewart, *Sec.-Treas.* 1,425 miles.

Texas-Empire Pipe Line Co. of Texas, P.O. Box 2420, Tulsa, Okla.

F. A. Stivers, *Pres.* and *Mgr.;* A. N. Horne and G. R. Kinter, *V.P.s;* C. D. Ruff, *Sec.-Treas.* 214 miles, 12-in.

Texas-New Mexico Pipe Line Co., P.O. Box 2332, Houston, Tex.

B. E. Hull, *Pres.* and *Mgr.;* A. S. Bailey, *V. P.* and *Asst. Mgr.;* R. B. McLaughlin, *V. P.* and *Asst. Mgr.;* J. R. Manion and Ira McFarland, *V. P.s;* G. W. Fox, *Sec.;* J. W. Emison, *Treas.* 1,317 miles.

Texas Pipe Line Co., P.O. Box 2332, Houston, Tex.

B. E. Hull, *Pres.* and *Mgr.;* A. S. Bailey, J. K. McGoldrick and R. B. McLaughlin, *V. P.s* and *Asst. Mgrs.;* G. W. Fox, *Sec.;* J. W. Emison, *Treas.* 4,620 miles.

Texas Pipe Line Co. of Oklahoma, P.O. Box 2332, Houston, Tex

J. K. McGoldrick, *Pres.;* J. H. Hill and B. E. Hull, *V. P.s;* H. L. Stewart, *Sec.-Treas.* 1,248 miles.

Texpata Pipe Line Co., 1020 Salinas Ave., Laredo, Tex.

O. W. Killam, *Pres.;* Winfield Killam, *V. P.;* W. T. Killam, *Sec.-Treas.* 24 miles, 4-in.

Thurber Pipe Line Co., 2300 Fort Worth National Bank Bldg., Fort Worth, Tex.

J. R. Penn, *Pres.;* R. J. Fleckenstein, *V. P.;* R. Seibel, *Sec.-Treas.;* C. H. Martin, Box 220, Ranger, Tex.; W. M. Brown, Ranger, Tex.; C. C. Mitchell, Ranger, Tex.; W. W. Mitchell, Ranger, Tex.; Gale Smith, Ranger, Tex.; William McGinnis, Route 1, Mingus, Tex.; W. B. Sinclair, Ranger, Tex.; E. W. Williams, Ranger, Tex., *Operating Personnel;* J. C. Davis, *Pur. Agt.* 108 miles, 2 to 5⅛-in.

Tidal Pipe Line Co., 17 Battery Place, New York, N. Y.

G. J. Hanks, *Pres.;* E. H. Salrin, Houston, Tex., and G. R. Kinter, Tulsa, Okla., *V. P.s;* Y. P. Broome, Tulsa, Okla., *Sec.;* K. R. Hankinson, *Treas.;* C. F. Guinn, Box 731, Tulsa, Okla., *Supt.;* H. C. Holt, Box 1347, Seminole, Okla., *Okla. Dist. Foreman;* H. R. Knauth, Box 777, Joinerville, Tex., *E. Tex. Dist. Foreman;* F. R. Davis, Box 607, Conroe, Tex., *Conroe Dist. Foreman.* 407 miles, 2 to 8-in.

Tide-Water Pipe Co., The., Ltd., 54 Boylston St., Bradford, Pa.

George J. Hanks, *Pres.;* J. Z. Van Tine, *V. P.* and *Gen. Mgr.;* C. W. Morrison, *Sec.;* K. R. Hankinson, *Treas.;* E. W. Duggan, *Supt.;* G. B. Valentine, *Supt., Tel. and Tel.;* H. B. Gardner, *Pur. Agt.;* L. C. Harding, *Master Mechanic;* C. G. Grimsby, *Construction Engr.;* C. F. Sloan, Plainfield, N. J., and H. Pass, Muncy, Pa., *Dist. Foremen;* H. A. Happle, Rixford, Pa.; M. E. Lignian, Coudersport, Pa.; G. S. Brown, Muncy, Pa.; E. F. Wayne, Shumans, Pa.; W. A. Fry, Weatherly, Pa.; J. W. Geiger, Changewater, N. J., *Foremen.* 576 miles, 6-in.

Tide Water Associated Oil Co., Associated Division, 79 New Montgomery St., San Francisco, Calif.

William F. Humphrey, *Pres.;* L. F. Bayer, L. C. Decius, and L. D. Jurs, *V. P.s;* J. P. Edwards, *Exec. Sec.;* W. A. Sloan, *Regional Treas.;* H. B. Haney, *Mgr. of Transportation;* D. L. Hines, *Ch. Engr. of Pipe Lines.*

San Joaquin Valley Pipe Line System, P.O. Box 1101, Coalinga, Calif.

G. E. Herrimann, *Supt.;* G. W. Knowles, *Asst. Supt.,* D. Meredith, *Maintenance Engr.;* W. W. Mitchell, *Div. Supt. of Operations;* E. A. Lyons, Jr., *Div. Supt. of Operations;* R. M. Heidenrich, *Field Engr.; Const. and Maintenance Foremen:* O. L. Hammond, C. Foster, D. W. Heeren, and G. W. Chapin, T. Harper, Box 261, Monterey, Calif., *Foreman Monterey Terminal.*

Southern California Pipe Line System, P.O. Box 725, Wilmington, Calif.

F. E. Coyle, *Supt.;* W. S. Davidson, *Jr., Asst. to Supt.;* G. A. Reeve, *Supt. San Pedro Terminal;* E. A. Siddall, *Traveling Engr.;* F. H. Adams, *Ch. Engr. Watson;* A. L. Piper, *Field Engr.;* W. E. Gillfillan, Box 811, Ventura, Calif., *Foreman Ventura Terminal.* 825 miles, 6 and 8-in.

Toronto Pipe Line Co., 507 Philtower Bldg., Tulsa, Okla.

A. L. Ellsworth, *Pres.;* William K. Whiteford, *Exec. V. P.;* J. C. Millar, *V. P.* and *Treas.;* Mayo E. McKeown, *Sec.;* J. E. Thurman, *Asst. Treas.;* C. M. Bryson, *Gen. Supt.;* A. M. Felsman, Box 938, Arp, Tex., *Div. Supt.;* G. J. Blackard, Box 938, Arp, Tex., *Dist. Gager;* J. W. Johnson, Shelby, Mont., *Dist. Mgr.;* T. A. Branch, Box 937, Cut Bank, Mont., *Div. Supt.* 143 miles, 2 to 8-in.

Transit & Storage Co., 208 Sperry Bldg., Port Huron, Mich.

P. R. Naylor, *Pres.;* J. R. Simpson, 56 Church St., Toronto, Ontario, *V. P.;* George Kelting, *V. P.* and *Sec.-Treas.;* B. E. Ireson, *Asst. Sec.-Treas.;* Harry Wheatley, Wayne, Mich.; *Gen. Mgr.;* Joseph E. Letson, Wayne, Mich., *Asst. Gen. Mgr.;* Herbert Trefz, *Asst. Supt.* 150 miles, double 6-in., 60 miles 8-in.

Transport Oil Co., 4323 South Western Blvd., Chicago, Ill.

V. S. Welch, *Pres.;* R. S. Watt, *Sec.-Treas.;* Nolan Williams, Oil City, La., *Supt.* 10 miles, 4-in.

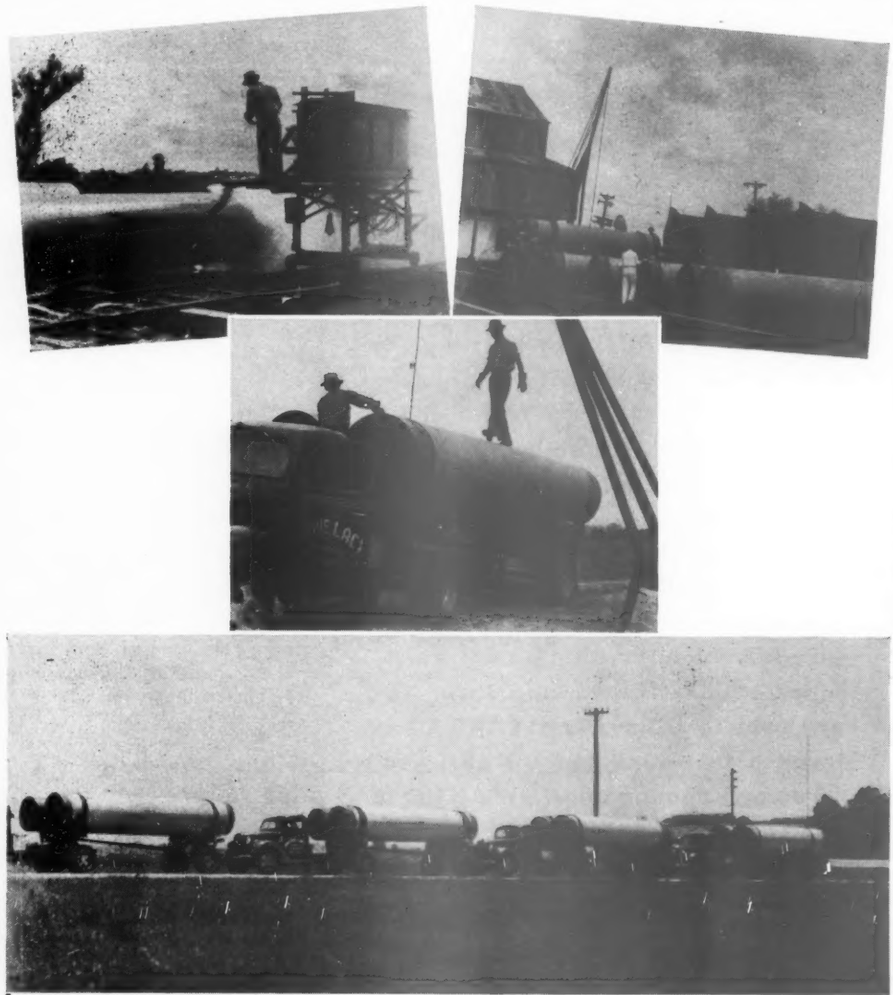
Tuscarora Oil Co., Ltd., Harrisburg, Pa.

E. J. Lewis, *Pres.;* W. E. Beckner, *V. P.;* J. W. de Groot, *Ch. Engr. and Asst. to Pres.;* Henry Hoffman, *Sec.-Treas;* W. E. Beckner, B. M. Hildebrand and A. F. Aylesworth, *Supts.;* D. E. Cully, Myerstown, Pa., and J. N. Stepp, Indiana, Pa., *Foremen Maintenance.* 60 miles, 6 and 8-in.

U

Union Oil Co. of California, 617 West Seventh St., Los Angeles, Calif.

Reese H. Taylor, *Pres.;* W. L. Stewart, Jr., V. H. Kelly, A. C. Rubel, A. C. Galbraith, *V. P.s;* A. C. Stewart, *Asst. V. P.;* W. R. Edwards, *Sec.;* H. W. Sanders, *Treas.;* W. W. Hay, *Mgr., Pipe Lines;* R. V. Rosborough, Box 661, San Luis Obispo, Calif., *Supt., Northern Div. Pipe Line;* J. H. Robinson, Box DD, Santa Fe Springs, Calif., *Supt., Southern Div. Pipe Line;* H. H. Yackey, San Luis Obispo, Calif., and Nick Ugrin, San Luis Obispo, Calif., *Asst. Supts., Northern Div. Pipe Line;* W. K. Straley, R.F.D. No. 1, Box 146H, Bakersfield, Calif.; Harold Cole, 522 B. St., Taft, Calif.; E. R. Smith, Box 661, San Luis Obispo, Calif.; L. A. Sarter, 684 Islay St., San Luis Obispo, Calif., *Dist. Foremen, Northern Div. Pipe Line;* P. G. Shekelle, 1179 Pismo St., San Luis Obispo, Calif., *Wharf Foreman, Northern Div. Pipe Line;* A. E. Norman, 525 West Florence St., LaHabra, Calif., and J. D. Gordinier, R.F.D. No. 1, Box 411A, Torrance, Calif., *Dist. Foremen, Southern Div. Pipe Line;* R. S. Sage, Santa Fe Springs, Calif., *Ch. Dispatcher, Southern Div. Pipe Line;* J. E. Dearborn, Box 661, San Luis Obispo, Calif., *Ch. Dispatcher, Northern Div. Pipe Line;* J. A. Sleeth, Box DD, Santa Fe Springs,



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Calif., *Ch. Gager;* A. L. Heggie, *Ch. Clerk, Pipe Lines.* 972 miles, 8-in.

United Oil Pipe Line Co., P.O. Box 1407, Shreveport, La.
N. C. McGowen, *Pres.;* B. M. Nowery and R. H. Hargrove, *V. P.s;* S. L. Davis, *Comptroller;* J. H. Miracle, *Sec.;* A. L. McClellan, *Treas.;* R. E. Hull, *Gen. Auditor;* W. F. Hartwig, *Gen. Supt.;* M. W. Ransom, *Field Supt.;* C. R. Kates, *Field Foreman;* R. R. Adair, *Ch. Clerk.* 70 miles, 4 to 8-in. transmission lines; 9 miles, 2 to 6-in. gathering lines.

Upshur Pipe Line, 503 McWilliams Bldg., Longview, Tex.
Paul H. Pewitt, *Owner;* J. R. McGee, *Supt.;* L. M. Dougherty, Gager. 6 miles, 4-in.

Utah Oil Refining Co., Utah Oil Bldg., Salt Lake City, Utah
T. A. Dines, *Pres.;* William R. Wallace, M. J. Greenwood, E. S. Holt, A. N. Johnson, *V. P.s;* A. N. Johnson, *Sec.-Treas.;* C. W. Butler, Kearney, Neb., *Supt.;* J. C. Burch, Rawlins, Wyo., *Dist. Foreman;* Stanolind Pipe Line Co., Tulsa, Okla., *Operator.* 487 miles, 4 to 8-in.

V

Valley Pipe Line Co., Ltd., 604 Second St. West, Calgary, Alta, Canada
F. B. Bimel, *Chm. Bd.;* A. H. Hannah and T. E. Burns, *Directors;* S. G. Coultis, *Pres.;* J. H. McLeod, *V. P.;* C. E. Young, *Sec.-Treas.* 95 miles, 4 and 6-in. trunk lines; located in Canada.

Valley Pipe Line Co., 417 South Hill St., Los Angeles, Calif.
C. P. Watson, *Pres.;* L. R. Holmes, *V. P.;* Alfred W. Mitchem, *Sec.;* William A. Russell, *Treas.;* W. H. Lawrence, *Supt.* 72 miles, 10-in.

Valley Pipe Line Co., 1904 Alamo National Bank Bldg., San Antonio, Tex.
T. Frank Murchison, *Pres.;* E. M. Closuit, *V. P.;* Nelson P. Wimberly, *Sec.-Treas.;* H. H. Hensley, McAllen, Tex., *Supt.* and *Gen. Mgr.;* L. E. Ethemgtar, *Asst. Supt.;* J. D. Hull, *Maintenance Supt.;* R. J. Glover, *Station Engineering Foreman; Station Operators:* W. W. Files, Jean Taylor, Chas. King, G. F. Irby, C. E. Stewart, W. C. Carten, E. E. Hallar, J. R. Parmer, O. G. Harding, Harold Randle, R. D. Armstrong, E. L. Mays; J. D. Baxter and Frank Mays, *Gagers.* 188 miles, 3 to 6-in.

Valvoline Oil Co., Cincinnati, Ohio.
G. P. Doll, *Pres.;* C. J. Leroux, *V. P.* and *Treas.;* C. W. Luton, *V. P.;* C. C. Gould, *Sec.;* Lee Lundy, *Mgr. Central Div.;* Wilson Henry, *Mgr. Western Div.,* Chicago; R. B. Smethurst, *Mgr. Atlantic Div.,* New York City; E. E. McNerney, *Mgr. Pacific Div.,* Los Angeles; E. H. Shepherd, *Pur. Agt.;* H. J. Dunmire, Butler, Pa.; *Ref. Sales;* J. J. Dunlevy, Butler, Pa., *Mgr. Pipe Lines.* 500 miles, 3-in. trunk lines; 1,150 miles, 2-in. gathering lines.

Vickers Petroleum Co., Wichita, Kans.
J. A. Vickers, *Pres.;* C. L. Henderson, *V. P.;* John S. Wertz, *Sec.-Treas.;* H. G. Shaw, *Traf* and *Pur. Mgr.;* A. M. Shrepfer, *Ref. Supt.;* John M. Little, *Prod. Supt.;* C. N. Davis, *Pipe Line Supt.* 65 miles, 3 and 4-in.

W

Wabash Pipe Line Co., 35 East Wacker Drive, Chicago, Ill.
D. D. Irwin, *Pres.;* Henry Hauseman and J. W. Meehan, *V. P.;* C. H. Jay, *Sec.-Treas.;* J. H. Botkin, *Comptroller;* D. E. Sullivan, *Ch. Engr.;* J. W. Meehan, Olney, Ill., *Supt.;* F. Thrasher, Olney, Ill., *Asst. Supt.* 47 miles, 8 and 10-in.

Webb County Gathering System, Inc., Smith-Young Tower, San Antonio, Tex.
H. M. Reed, *Pres.;* B. C. Bollberg, *V. P.;* Grace Miller, *Sec.-Treas.;* J. G. McIntosh, 538 Southern St., Corpus Christi, Tex., and O. D. Riddle, Hebbronville, Tex., *Supts.* 4 miles, 4-in.

Western Pipe Line Co., Inc., Union National Bank Bldg., Wichita, Kans.
I. A. O'Shaughnessy, *Pres.;* F. L. Jehle and J. F. O'Shaughnessy, *V. P.s;* L. W. Dyer, *Sec.-Treas.;* F. A. Smalley, *Pipe Line Supt.* 48 miles, 2 to 8-in.

Wilcox, H. F., Oil & Gas Co., Tulsa, Okla.
H. F. Wilcox, *Pres.;* F. H. Dunn and M. P. Appleby, *V. P.'s;* C. L. Miller, *Sec.;* M. P. Appleby, *Treas.;* Jack Clover, *Gen Field Supt.;* W. R. Bingham, *Engr.;* W. M. Fraser, Bristow, Okla., *Ref. Supt.;* H. B. Ward, *Land Dept.* 100 miles, 2 to 4-in. gathering lines.

Y

Yount-Lee Pipe Line Co., Box 591, Tulsa, Okla.
A. W. Peake, *Pres.;* F. O. Prior and A. M. McCorkle, *V. P.s;* F. J. Keleher, *Sec.-Treas.;* C. S. Sanders, *Gen. Supt.;* M. C. Hoffman, *Asst. Gen. Supt.;* J. A. Grant, Beaumont, Tex., *Dist. Pipe Line Foreman.* 250 miles, 10-in.

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A

Arkansas Fuel Oil Co., Shreveport, La.

T. W. Tutwiler, *Pres.;* D. W. Harris, *V. P.* and *Gen. Mgr.;* A. F. Holliday and J. A. Welch, *V. P.s;* J. S. Sheffield, *Sec.;* M. J. Lasseigne, *Treas.;* A. H. Weyland, *Gen. Supt.;* H. T. Goss, *Ch. Engr.;* J. Lucas, *Mgr. of Purchases;* G. L. Gano, *Mgr.;* P. T. Thibodaux, *Operating Supt.;* R. L. Waldron, Oil City, La., and C. O. Rhodes, Haynesville, La., *Dist. Supts.* 189 miles, 6 and 8-in. leased.

B

Buffalo Pipe Line Corp., P.O. Box 3, Big Flats, Chemung County, N. Y.

Robert C. Tuttle, 260 S. Broad St., Philadelphia, Pa., *Pres.* and *Gen. Mgr.;* Robert H. Colley and H. G. Schad, *V. P.s;* Robert E. Coleman, *Sec.;* Paul Shuman, *Treas.;* J. M. Williams, Philadelphia, *Supt.,* R. H. Lynch, Philadelphia, W. S. Schmidt, Philadelphia, and W. E. Stainback, Big Flats, *Asst. Supts.,* Robert I. Cozzens, Philadelphia, T. L. Opie, Philadelphia, E. T. Marsh, Philadelphia, *Engineers;* S. J. Higginbotham, *Foreman;* S. C. Weber, 108 Hart St., Batavia, N. Y., and S. D. McKinstry, 505 University Ave., Rochester, N. Y., *Chemists* and *Testers.* 161 miles, 8-in.

C

Champlin Refining Co., Enid, Okla.

H. H. Champlin, *Pres.;* Joe N. Champlin, *V. P.;* D. W. Cotton, *Sec.-Treas.;* E. G. Wilmoth, *Mgr. of Pipe Lines;* B. Payne, *Field Supt.* 550 miles, 6-in.

D

Derby Oil Co., Wichita, Kans.

Carl Fisher, *Pres.;* H. E. Zoller, *Exec. V. P.;* S. P. Wallingford, *V. P.;* E. G. Wasser, *Sec.;* E. C. Claiborne, *Treas.;* John Schell, *Mgr. Pipe Lines;* L. E. Woods, *Supt.;* E. Edwards, Hutchinson, Kans., *Foreman.* 56 miles.

Detroit Southern Pipe Line Co., 35 East Wacker Drive, Chicago, Ill.

C. B. Watson, *Pres.;* D. D. Irwin and Henry Hauseman, *V. P.s;* C. H. Jay, *Sec.-Treas.;* J. H. Botkin, *Comptroller;* D. E. Sullivan, *Ch. Engr.;* George E. Weber, Hamtramck, Mich., *Supt.* 85 miles, 6-in. (13 miles leased from others).

G

General Petroleum Corp. of California, 108 West Second St., Los Angeles, Calif.

A. L. Weil, *Pres.;* R. A. Sperry, B. E. Parsons, S. J. Dickey, A. H. DeFriest, and E. L. Adams, *V. P.s;* D. W. Woods, *Sec.;* W. Cunningham, *Treas.;* J. L. Martin, 2525 East 37th St., Vernon, Calif., *Gen. Supt.;* R. F. Kline, Vernon, Calif., *Asst. Gen. Supt.;* F. D. Posey, Vernon, Calif., *Engr.;* W. J. MacArthur, Vernon, Calif., *Master Mechanic.* 112 miles, 2 to 8-in.

Great Lakes Pipe Line Co., P.O. Box 2239, Kansas City, Mo.

Dan Moran, *Pres.;* Harry Moreland and James J. Cosgrove, *V. P.s;* P. A. Ward, *Sec.-Treas.* 2,127 miles, 4 to 8-in.

H

Hanlon Pipe Line Co., Nat'l. Bank of Tulsa Bldg., Tulsa, Okla.

D. E. Buchanan, *Pres.;* J. H. Boyle, *V. P.* and *Sec.-Treas.;* C. E. Wharton, Gladewater, Tex., *Gen. Supt.;* G. H. L. Kent, Gladewater, Tex., *Supervisor.* 35 miles, 4 to 8-in.

K

Keystone Pipe Line Co., 260 South Broad St., Philadelphia, Pa.

Robert C. Tuttle, *Pres.* and *Gen. Mgr.;* R. H. Colley, and H. G. Schad, *V. P.s;* B. G. McKain, *Sec.;* Paul Shuman, *Treas.;* J. M. Williams, *Dept. Head* and *Supt.;* Robert I. Cozzens, T. L. Opie, and E. T. Marsh, *Engineers;* Carl F. Preuss, Box 43, Wernersville, Pa., *Ch. Station Engr.;* R. C. Ferrill, 3144 Passyunk Ave., Philadelphia, Pa., J. M. Turner, Box 86, Sinking Spring, Pa., W. A. Kline, R.F.D. 5, Lebanon, Pa., E. T. White, Box 2, Newville, Pa., and W. L. Keister, Box 168, Hollidaysburg, Pa., *Station Engrs.;* Robert H. Lynch and W. S. Schmidt, Philadelphia, and R. B. O'Neal, Box 86, Sinking Spring, Pa., *Asst. Supts.;* R. E. Johnson, Box 86, Sinking Spring, Pa., and L. Baxter, Box 168, Hollidaysburg, Pa., *Foremen;* W. H. Hughes, Box 86, Sinking Spring, Pa., and Paul Bause, Box 168, Hollidaysburg, Pa., *Asst. Foremen;* C. T. Crook, 17 Oriental Ave., Westmont, N. J., W. A. Stephens, 822 N. Fourth St., Reading, Pa., J. T. Turner, Box 430, Altoona, Pa., B. B. Poticher, 8879 Frankstown Road, Wilkinsburg, Pa., J. C. Wylie, Hotel Sterling, Wilkes Barre, Pa., W. H. Penn, 1311 Mineral Spring Road, Reading, Pa., and J. M. Lindfors, Jr., 826 N. Easton Road, Glenside, Pa., *Chemists* and *Testers.* 814 miles, 4 to 12-in.

L

Lawrence Pipe Line Co., P.O. Box 2332, Houston, Tex.

B. E. Hull, *Pres.;* A. S. Bailey and R. B. McLaughlin, *V. P.s;* G. W. Fox, *Sec.;* J. W. Emison, *Treas.* 57 miles.

Lion Oil Refining Co., Exchange Bldg., El Dorado, Ark.

Col. T. H. Barton, *Pres.;* T. M. Martin, A. F. Reed, J. J. Allinson, and J. E. Howell, *V. P.s;* Jeff Davis, *Sec.;* R. E. Meinert, *Treas.;* J. E. Howell, *Chg. of Prod. and Pipe Lines;* E. W. Hardage, *Supt. Prod. and Pipe Lines;* Joe B. Tims, *Pipe Line Supt.;* J. D. Kendrick, *Ch. Gager;* V. M. Speer, *Pipe Line Connection Foreman;* J. L. Nutt and J. D. Herring, *Pump Repairmen;* L. O. Preddy, J. E. Coley, Sr., and V. E. Vaulbree, *Station Engrs.;* J. L. Greene, *Dist. Gager,* El Dorado Dist.; D. C. Ellen, *Dist. Gager,* Schuler Dist. 14 miles, 4-in.

M

Magnolia Pipe Line Co., P.O. Box 900, Dallas, Tex.

D. A. Little, *Pres.;* L. S. Sinclair, J. L. Latimer, Walace Hawkins, M. J. McLaughlin, George Miller, and John W. Newton, *V. P.s;* Guy L. Tate, *Sec.;* W. L. Holmes, *Treas.;* L. H. True, *Asst. Mgr.;* O. D. Stallard, *Supt. Central Div.;* A. R. Ehrhardt, *Supt. Maintenance;* A. J. Balcom, *Gen. Supt. Tel. and Tel. Dept.;* J. W. Hale, *Asst. Gen. Supt. Tel. and Tel. Dept.;* H. H. Watson, *Supt. Tel. and Tel. Dept.;* D. H. Levy, *Electrical Engr. Tel. and Tel. Dept.;* L. E. Adler, *Engr. Tel. and Tel. Dept.;* J. G. Norton, *Ch. Mechanical Engr.;* F. P. Childress, *Ch. Oil Dispatcher;* Don R. Gladney, *Supt. Right-of-Way and Claim Dept.;* George T. Jackson, *Supt. Welders;* E. A. Koenig, *Corrosion Engr.;* C. E. Still, *Supt. Dallas Dist.;* H. F. Smith, Box 1232, Electra, Tex., *Supt. North Texas Dist.;* F. D. Breedlove, Box 1073, Midland, Tex., *Supt. West Texas Dist.;* L. A. Hancock, Box 1909, Longview, Tex., *Supt. East Texas Dist.;* C. R. Swank, Box 1406, Shreveport, La., *Supt. La. and Ark. Dist.;* J. E. McGeath, Box 2121, Houston, Tex., *Supt. Southern Div.;* J. H. Joy, Box 2121, Houston, Tex., *Supt. Tomball Dist.;* H. C. Alton, Box 150, Alice, Tex., *Supt. Southwest Texas Dist.;* R. W. Stewart, Box 550, Luling, Tex., *Supt. Luling Dist.;* J. A. Smith, Box 29, Olden, Tex., *Supt. Olden Dist.;* A. T. Glover, Box 1828, Oklahoma City, Okla., *Supt. Northern Div.;* V. L. Red, Box 1828, Oklahoma City, Okla., *Supt. Cushing-Oklahoma City Dist.;* O. M. Joy, Box 1261, Wewoka, Okla., *Supt. Wewoka Dist.,* H. M. Van Buskirk, Box 368, Healdton, Okla., *Supt. Healdton Dist.;* A. W. Frey, Box 618, Corsicana, Tex., *Asst. Supt. Maintenance;* C. C. Coffindoffer, Box 1406, Shreveport, La., *Dist. Foreman La. and Ark.;* C. R. Fitch, Box 1073, Midland, Tex., *Foreman West Texas Dist.;* E. M. Phillips, Box 1828, Oklahoma City, Okla., *Ch. Gager, Oklahoma Div.;* N. J. Jacobi, Box 1232, Electra, Tex., *Ch. Gager. Central Div.;* D. R. Ford, Box 1909, Longview, Tex., *Ch. Gager, Central Div.;* M. E. Powell, Box 150, Alice, Tex., *Ch. Gager, Southern Div.;* E. A. Volts, Box 1828, Oklahoma City, Okla., *Gen. Foreman Tel. and Tel. Dept.* 284 miles, 3 to 6-in.

Middlesex Pipe Line Co., Trenton, N. J.

J. N. Pew, Jr., 1608 Walnut St., Philadelphia, Pa., *Pres.;* J. Edgar Pew and Frank L. Hadley, Philadelphia, Pa., *V. P.s.;* Frank Cross, Philadelphia, Pa., *Sec.-Treas.;* Frank L. Hadley, Philadelphia, *Chg. of Operations;* Clyde Pidcock, New Brunswick, N. J., *Supt.;* Henry Thomas, Philadelphia, *Consulting Engr.* and *Dir. of Purchases;* Porter L. Howard, Philadelphia, *Traf. Mgr.;* R. W. Bowers, Philadelphia, *Ch. Dispatcher;* B. K. Morse, Philadelphia, *Ch. Engr.;* J. M. Pearson, Philadelphia, *Physicist;* Raymond F. Hadley, Philadelphia, *Electrical Engr.;* Louis M. Miller, Philadelphia, *Supervisor of Meters;* Paul H. Coe, 222 Conewango Avenue, Warren, Pa., *Supervisor of Linewalkers.* 56 miles, 8-in.

N

National Transit Co., 206 Seneca St., Oil City, Pa.

D. M. Sachs, *Pres.;* J. H. Contino, *V. P.* and *Treas.;* F. G. Zimmerman, *Sec.;* E. H. Fortmann, *Gen. Mgr.;* S. D. Osborne, *Oil Traf. Dispatcher;* M. W. Robinson, *Valuation Engr.;* C. L. Guignon, Warren, Pa., *Supt.;* J. A. Carlson and C. R. Tompsett, *Foremen;* George Galmish, Butler, Pa., *Supt.* 18 miles, 2 to 4-in.

P

Phillips Petroleum Co., Bartlesville, Okla.

K. S. Adams, *Pres.;* Don Emery, *V. P.* and *Gen. Counsel;* G. G. Oberfell, *V. P. Research Dept.;* H. E. Koopman, *V. P. Pur. Dept.;* C. P. Dimit, *V. P. Prod. Dept.;* M. P. Youker, *V. P. Ref. Dept.;* F. E. Rice, *V. P. Natural Gasoline Dept.;* A. M. Hughes, *V. P. Sales Dept.;* J. M. Sands, *V. P. Economics Dept.;* C. R. Musgrave, *V. P. Traf. Dept.;* C. O. Stark, *V. P. Land and Geological Dept.;* A. H. Riney, *V. P. Engineering Dept.;* R. C. Jopling, *V. P. Public Relations Dept.;* H. A. Trower, *V. P. Retirement Committee;* B. F. Stradley, *Sec.;* R. M. Riggins, *Treas.*

Borger, Tex., to East St. Louis, Ill., Division

A. W. Hubbell, *Gen. Supt.;* W. D. Griffith, Box 98, Attica, Kans.; H. G. Banter, Box 107, Buffalo, Okla.; E. A. Hess, Box 1, Cassoday, Kans.; H. R. McPherson, Box 188, Cheney, Kans.; Glenn Phillips, R.R. No. 2, Booker, Tex.; C. D. Traywick, Aetna, Kans.; J. B. Jones, Box 318, Harrisonville, Mo.; A. J. Kaullen, Box 295, Jefferson City, Mo.; Rex DuVal, R. No. 3, Box 118, Laverne, Okla.; Jess Bradshaw, Rt. No. 2, Leeton, Mo.· Charles F. Higgins, Box 353, Madison, Kans.; R. L. Coleman, Box 133, Medicine Lodge, Kans.; Clinton Crick, Box 308, Olathe, Kans.; E. M. Pancake, Box 543, Eldorado, Kans.; E. T. Eisele, Richmond, Kans.; McKinley Johnson, Swiss, Mo.; Seth Tyler, Rt. No. 1, Waverly, Kans.; B. E. Plummer, Box X, Spearman, Tex.; George Winter, Stinnett, Tex.; C. R. Plummer, R.R., Florence, Mo.; Earl Durbin, Villa Ridge, Mo., *Ch. Engrs.;* E. L. Carter, Box 1088, Phillips, Tex.; E. L. Reed, Box 268, Kansas City, Kans.; J. E. Earnest, Box 109, Panola, Kans.; S. V. Montgomery, R.R. No. 1, Box 57, East St. Louis, Ill.; N. F. Ferrell, Box 397, Wichita, Kans., *Supts.;* O. P. Miller, 1232 Broadway, Kansas City, Mo., *Maintenance Supt.;* B. R. Kidd, Box 474, Burlington, Kans., *Ch. Mechanic.*

East St. Louis, Ill., to East Chicago, Ind., Division

L. B. Hesse, Box 349, Decatur, Ill.; O. R. Garinger, Box 349, Decatur, Ill.; F. B. Neptune, First National Bank Bldg., East Chicago, Ind.; W. R. Julien, Box 473, Kankakee, Ill., *Supts.;* C. M. Brown, R.R. No. 1, Box 292-A, East St. Louis, Ill.; Wiley Williams, R.F.D. No. 1, Box 18-A, Butler, Ill.; G. E. Humphrey, Maroa, Ill., *Ch. Engrs.;* J. W. Boyd, 224 First National Bank Bldg., East Chicago, Ind., *Gen. Supt.* 1,069 miles, 4 to 8-in.

R

Richfield Oil Corp., 555 South Flower St., Los Angeles, Calif.

H. F. Sinclair, *Chm. Bd.;* W. Alton Jones, *Chm. Finance Committee;* Charles S. Jones, *Pres.;* F. A.

Morgan, W. T. Dinkins, and A. M. Kelley, *V. P.s;* M. Richard Gross, *Treas.;* W. T. Autrey, *Comptroller;* Cleve B. Bonner, *Sec.;* E. B. Downey, *Asst. Sec.-Treas.;* Leonard Switzer, *Asst. Sec.;* A. H. B. Gore, Box 470, Long Beach, Calif., *Supt.;* Gordon B. Slater, Box 107, Lebec, Calif., *Div. Foreman;* E. T. Smith, Box 470, Long Beach, Calif., *Engr.;* L. A. Wilson, Long Beach, Calif., *Field Engr.;* William Hoffman, Long Beach, Calif., *Construction Foreman.* 123 miles, 2 to 8-in.

S

Shell Oil Co., Inc., (Pacific Coast Territory) 100 Bush St., San Francisco, Calif.

S. Belither, *Exec. V. P.* and *Chm. Bd.;* F. S. Clulow, E. F. Davis, D. Heggie, C. E. Mott, L. G. McLaren, *V. P.s;* A. R. Bradley, *Asst. Sec.;* J. H. White, *Asst. Treas.;* F. B. Simms, Shell Bldg., Los Angeles, Calif., *Mgr.;* W. C. Roberts, Los Angeles, *Asst. Mgr.;* M. C. Alcorn, Los Angeles, *Dist. Supt.;* E. W. Jenkins, Box 329, Tracy, Calif., *Dist. Supt.;* H. H. McQueen, Box 329, Tracy, Calif., *Asst. Dist. Supt.;* F. O. McKeany, Los Angeles, *Oil Dispatcher.* 171 miles, 2 to 6-in. (including 16 miles leased from others).

Socony-Vacuum Oil Co., Inc., 26 Broadway, New York, N. Y.

John A. Brown, *Pres.;* C. E. Arnott, E. R. Brown, A. F. Corwin, G. V. Holton, and H. F. Sheets, *V. P.s;* William D. Bickham, *Sec.;* Arthur T. Roberts, *Treas.* 249 miles (including subsidiaries shown in separate reports).

Socony-Vacuum Oil Co., Inc., White Eagle Div., Federal Reserve Bank Bldg., Kansas City, Mo.

R. R. Irwin, *Gen. Mgr.;* H. K. Phipps, Wichita, Kans., *Gen. Supt. Crude Pipe Lines;* C. C. Durkee, *Gen. Supt. Gasoline Pipe Lines;* L. R. Dickinson, Wichita, Kans., *Ch. Engr.* 180 miles, 6-in.

Southeastern Pipe Line Co., 714 Forsyth Bldg., Atlanta, Ga.

Ryburn G. Clay, *Pres.;* B. W. Winters, *V. P.* and *Gen. Mgr.;* J. E. Slider, *Sec.-Treas.* 450 miles, 6 and 8-in. (under construction).

Southern Pipe Line Corp., 411 North Broadway, Corpus Christi, Tex.

Clarence M. Brown, *Pres.;* Maston Nixon, *V. P.;* I. C. Hatridge, *Asst. V. P.;* F. W. Currier, *Treas.;* Henry Winters, *Gen. Supt.;* Joe L. Reed, *Supt.;* Sam F. Crecelius, *Asst. Supt.;* Cecil Threadgill, *Terminal Gager;* Frank P. Peterson, Jr., *Ch. Engr.* 6½ miles, 3½-in.

Standard Oil Co. of California, 225 Bush St., San Francisco, Calif.

H. D. Collier, *Pres.;* R. K. Davies, M. E. Lombardi, and A. S. Russell, *V. P.s;* J. H. Tuttle, *Sec.;* G. J. O'Brien, *Treas.* 22½ miles, 6-in.

Standard Oil Co., (Indiana), 910 So. Michigan Ave., Chicago, Ill.

Edward G. Seubert, *Pres.;* C. J. Barkdull, *Exec. V. P.;* Allan Jackson, *V. P.;* Amos Ball, *V. P. Chg. Sales;* A. W. Peake, *V. P. Chg. Prod.;* Max G. Paulus, *V. P. Chg. Mfg.;* Bruce K. Brown, *Gen. Mgr. Research and Dev.;* Buell F. Jones, *Gen. Counsel Chg. Law Dept.;* Ralph E. Clarke, *Treas.;* Felix T. Graham, *Sec.;* Carl T. Bergeson, *Comptroller;* Lee R. Cowles, *Traf. Mgr.;* Robert W. Fyfe, *Asst. Traf. Mgr.;* J. F. Hewson, *Mgr. of Purchases;* Frank V. Martinek, *Asst. V.P.;* J. W. Curry, *Mgr. Labor Relations;* C. W. Smith, *Mgr. Safety;* Conger Reynolds, *Dir. Public Relations;* F. E. Wood, *Supt. of Pipe Lines.* 180 miles, 8-in.

Standard Oil Co. (Ohio), Midland Bldg., Cleveland, Ohio

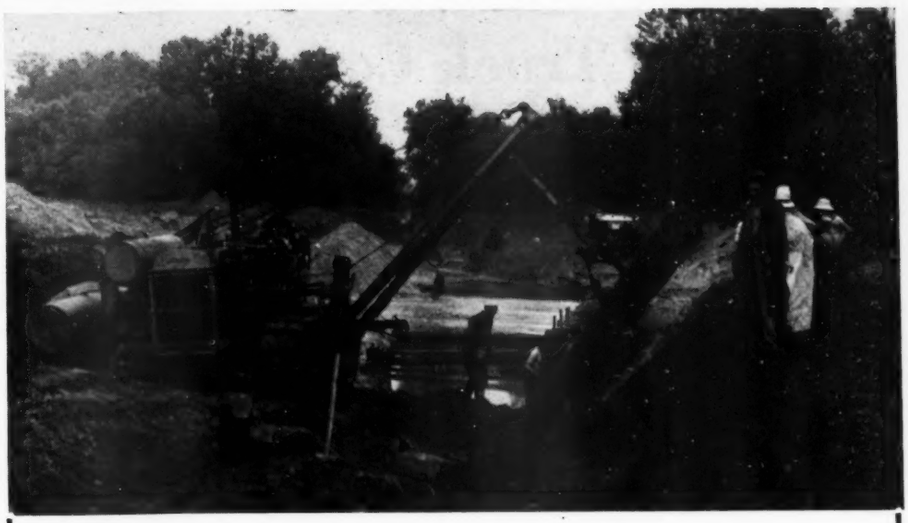
W. T. Holliday, *Pres.;* S. A. Swensrud, *V. P., Chg. Supply and Transportation;* W. J. Semple, *V. P.* and *Sec.-Treas.;* A. M. Maxwell and A. A. Stambaugh, *V. P.s;* S. H. Elliott, *Mgr., Pipe Line Dept.* 228 miles, 4 to 8-in.

Stratton Pipe Line Corp., 2000 Natl. Bank of Tulsa Bldg., Tulsa, Okla.

W. K. Warren, *Pres.;* E. E. DeBack and Glenn E. Alexander, *V. P.s;* Gardiner Symonds, *Sec.-Treas.,* E. E. DeBack, *Gen. Supt.;* Glenn E. Alexander, *Supt* 52 miles, 3½ to 6-in.

Sun Oil Line Co., 1608 Walnut St., Philadelphia, Pa.

J. N. Pew, Jr., *Pres.;* Frank L. Hadley, *V. P. in Chg. of Operations;* H. O. Cameron, Toledo, Ohio, *V. P.;* Frank Cross, *Sec.-Treas.;* B. K. Morse, *Ch. Engr.;* R. W. Bowers, *Ch. Dispatcher;* Raymond F. Hadley, *Electrical Engr.;* J. M. Pearson, *Physicist;* Louis M. Miller, *Supervisor of Meters;* P. H. Coe, 222 Conewango Ave., Warren, Pa., *Supervisor of Linewalkers;* Walter W. Williams, 122 West College Ave., Kent, Ohio, *Supt.;* George Boyett, Box 136, Kent, Ohio, *Foreman;* Albert C. Moser, R.R. No. 1, Suffield, Ohio, *Ch. Engr.* Randolph Pump Station; Charles A. Hewson, R.R. No. 4, Youngstown, Ohio,



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Ch. Engr., Boardman Pump Station; Henry Thomas, *Consulting Engr.* and *Dir. of Purchases;* Porter L. Howard, *Traf. Mgr.* 98 miles, 3 and 6-in.

Sun Pipe Line, Inc., 301 Hiawatha Blvd., Syracuse, N. Y.

J. N. Pew, Jr., 1608 Walnut St., Philadelphia, Pa., *Pres.;* J. Edgar Pew and Frank L. Hadley, Philadelphia, *V. P.s;* Frank Cross, Philadelphia, *Sec.-Treas.;* Frank L. Hadley, Philadelphia, *Chg. of Operations;* Henry Thomas, Philadelphia, *Consulting Engr.* and *Dir. of Purchases;* Porter L. Howard, Philadelphia, *Traf. Mgr.;* R. W. Bowers, Philadelphia, *Ch. Dispatcher;* B. K. Morse, Philadelphia, *Ch. Engr.;* J. M. Pearson, Philadelphia, *Physicist;* Raymond F. Hadley, Philadelphia, *Electrical Engr.;* Louis M. Miller, Philadelphia, *Supervisor of Meters;* Paul H. Coe, 222 Conewango Ave., Warren, Pa., *Supervisor of Linewalkers;* H. Melvin Christ, 301 Hiawatha Blvd., Syracuse, N. Y., *Supt.* 87 miles, 6-in.

Susquehanna Pipe Line Co., 1608 Walnut St., Philadelphia, Pa.

J. N. Pew, Jr., *Pres.;* J. Edgar Pew and Frank L. Hadley, *V. P.s;* Frank Cross, *Sec.-Treas.;* Frank L. Hadley, *Chg. of Operations;* Henry Thomas, *Consulting Engr.* and *Dir. of Purchases;* Porter L. Howard, *Traf. Mgr.;* R. W. Bowers, *Ch. Dispatcher;* B. K. Morse, *Ch. Engr.;* J. M. Pearson, *Physicist;* Raymond F. Hadley, *Electrical Engr.;* Louis M. Miller, *Supervisor of Meters;* Paul H. Coe, 222 Conewango Ave., Warren, Pa., *Supervisor of Linewalkers;* James E. Ford, Icedale, Pa., *Supt. Eastern Div.;* F. H. Guthrie, Greensburg, Pa., *Supt. Western Div.* 611 miles, 2 to 8-in.

T

Tide Water Associated Oil Co., Associated Div., 79 New Montgomery St., San Francisco, Calif.

William F. Humphrey, *Pres.;* L. F. Bayer, L. C. Decius, and L. D. Jurs, *V. P.s;* J. P. Edwards, *Exec. Sec.;* W. A. Sloan, *Regional Treas.;* H. B. Haney, *Mgr. of Transportation;* D. L. Hines, *Ch. Engr. of Pipe Lines.*

***San Joaquin Valley* Pipe Line System, P.O. Box 1101, Coalinga, Calif.**

G. E. Herrmann, *Supt.;* G. W. Knowles, *Asst. Supt.;* D. Meredith, *Maintenance Engr.;* W. W. Mitchell, E. A. Lyons, Jr., *Div. Supts. of Operations;* R. M. Heidenreich, *Field Engr.;* O. L. Hammond, C. Foster, D. W. Heeren, and G. W. Chapin, *Construction* and *Maintenance Foremen;* T. Harper, P.O. Box 261, Monterey, Calif., *Foreman Monterey Terminal.*

***Southern California* Pipe Line System, P.O. Box 725, Wilmington, Calif.**

F. E. Coyle, *Supt.;* W. S. Davidson, Jr., *Asst. to Supt.;* G. A. Reeve, *Supt. San Pedro Terminal;* E. A. Dissall, *Traveling Engr.;* F. H. Adams, *Ch. Engr. Watson;* A. L. Piper, *Field Engr.;* W. E. Gillfillan, Box 811, Ventura, Calif., *Foreman Ventura Terminal.* 9 miles, 6 and 8-in.

Tuscarora Oil Co., Ltd., Harrisburg, Pa.

E. J. Lewis, *Pres.;* W. E. Beckner, *V. P.;* J. W. de Groot, *Ch. Engr. and Asst. to Pres.;* Henry Hoffman, *Sec.-Treas;* W. E. Beckner, B. M. Hildebrand and A. F. Aylesworth, *Supts.;* D. E. Cully, Myerstown, Pa., and J. N. Stepp, Indiana, Pa., *Foremen Maintenance.* 551 miles, 6 to 12-in.

U

Union Oil Co. of California, 617 West Seventh St., Los Angeles, Calif.

Reese H. Taylor, *Pres.;* W. L. Stewart, Jr., V. H. Kelly, A. C. Rubel, A. C. Galbraith, *V. P.s;* A. C. Stewart, *Asst. V. P.;* W. R. Edwards, *Sec.;* H. W. Sanders, *Treas.;* W. W. Hay, *Mgr., Pipe Lines;* R. V. Rosborough, Box 661, San Luis Obispo, Calif., *Supt., Northern Div. Pipe Line;* J. H. Robinson, Box DD, Santa Fe Springs, Calif., *Supt., Southern Div. Pipe Line;* H. H. Yackey, San Luis Obispo, Calif., and Nick Ugrin, San Luis Obispo, Calif., *Asst. Supts., Northern Div. Pipe Lines;* W. K. Straley, R.F.D. No. 1, Box 148H, Bakersfield, Calif.; Harold Cole, 522 B. St., Taft, Calif.; E. R. Smith, Box 661, San Luis Obispo, Calif.; L. A. Sarter, 664 Islay St., San Luis Obispo, Calif., *Dist. Foremen, Northern Div. Pipe Line;* P. G. Shekelle, 1179 Pismo St., San Luis Obispo, Calif., *Wharf Foreman, Northern Div. Pipe Line;* A. E. Norman, 525 West Florence St., LaHabra, Calif., and J. D. Gordinier, R.F.D. No. 1, Box 411A, Torrance, Calif., *Dist. Foremen, Southern Div. Pipe Line;* R. S. Sage, Santa Fe Springs, Calif., *Ch. Dispatcher, Southern Div. Pipe Line;* J. E. Dearborn, Box 661, San Luis Obispo, Calif., *Ch. Dispatcher, Northern Div. Pipe Line;* J. A. Sleeth, Box DD, Santa Fe Springs, Calif., *Ch. Gager;* A. L. Heggie, *Ch. Clerk, Pipe Lines.* 176 miles, 6-in.

U. S. Pipe Line Co., 35 East Wacker Drive, Chicago, Ill.

D. D. Irwin, *Pres.;* Henry Hauseman, *V. P.;* C. H. Jay, *Sec.-Treas.;* J. H. Botkin, *Comptroller;* D. F. Sullivan, *Ch. Engr.;* E. A. McCadden, Marcus Hook, Pa., *Supt.;* L. R. Williams, Marcus Hook, Pa., *Field Engr.* 58 miles, 5-in.

Personnel of Natural Gas Pipe-Line Companies

This survey lists companies operating transmission lines and does not include companies whose operations are confined to the distribution of natural gas or artificial gas in cities and towns

A

Allied Materials Corp., 507 Cotton Exchange Bldg., Oklahoma City, Okla.

T. A. Nicholson, *Pres.;* C. W. Barbour, *V. P.;* Mrs. E. E. Donnay, *Sec.-Treas.;* T. A. Pomeroy, Box 518, Stroud, Okla., *Supt. in chg. all operations.* 12 miles 4-in.

Ambridge Gas Co., 467 Maplewood Ave., Ambridge, Pa.

F. C. Schroeder, *Pres.* and *Treas.;* R. H. McCague, *V. P.;* F. C. Schroeder, Jr., *Sec.;* W. D. Ashenhart, *Mgr.* 5½ miles, 4 and 6-in.

American Michigan Pipe Line Co., 372 Morris Ave., Muskegon, Mich.

Glenn R. Chamberlain, *Pres.;* Dean W. Flowers, *V. P.* and *Gen. Mgr.;* C. J. Zorn, *Sec.-Treas.;* L. H. Hienke, *Asst. Sec.-Treas.;* T. M. Leahy, *Asst. Sec.-Treas.;* E. E. Swarvar, *Asst. Treas.;* Harry J. Gabel, *Supt.;* H. B. March, *Foreman.* 110 miles, 2 to 8-in.

Argus Natural Gas Co., Inc., Aquila Court Bldg., Omaha, Neb.

R. L. Harrison, *V. P. and Supt. Distribution.* 224 miles.

Arkansas Louisiana Gas Co., Shreveport, La.

D. W. Harris, *V. P.* and *Gen. Mgr.;* A. H. Weyland, *V. P.* and *Gen. Supt.;* H. D. Hancock and J. R. Munce, *V. P.s;* T. J. Heard, *Sec.;* B. R. Muirhead, *Treas.;* H. T. Goss, *Ch. Engr.;* J. Lucas, *Mgr. of Purchases.*

Pipe-Line Division.

W. H. Buckley, *Supt.;* R. P. Gonzales, *Asst. Supt.;* Paul Weeks, *Prod. Supt.;* W. E. Nester, *Compressor Station Supt.;* Earl Kightlinger, *Measurement Supt.;* F. S. Kelly, Jr., *Industrial Engr.;* R. H. Johnston, *Ch. Dispatcher;* T. L. Holcombe, *Ch. Clerk;* Bill Meares, *Asst. Prod. Supt.;* P. J. Chandler, *Asst. Compressor Station Supt.;* W. A. Long, *Pipe Line Supt. Div. No. 1;* Loni Sims; Carl Shively, Vivian, La.; Rufus Ramsey, Pittsburg, Tex., *Foremen Div. No. 1;* L. W. Young, Hope, Ark., *Pipe Line Supt. Div. No. 2;* Lambert Irwin, Russellville, Ark.; Roy Halbert, Malvern, Ark.; W. C. Miller, Hope, Ark.; Bill Price, Garland City, Ark., *Foremen, Div. No. 2;* Jim Griffith, El Dorado, Ark., *Pipe Line Supt., Div. No. 3;* O. H. Blackstock, Sterlington, La.; M. C. Ritter, Simsboro, La.; J. C. Riffe, El Dorado, Ark.; G. E. Blosser, El Dorado, Ark., *Foremen, Div. No. 3.*

Gas-Distribution Division.

W. M. Little, *Gen. Supt.;* Carroll Diller, *Supt. Maintenance Construction;* M. S. Bolinger, *Supt. Customer Service;* F. D. Krumpeln, *Ch. Clerk;* D. H. Thurston, El Dorado, Ark.; N. J. Kroencke, Texarkana, Ark.; F. D. Shanks, Pine Bluff, Ark.; C. H. Thorpe, Little Rock, Ark., *Managers;* W. S. Tobey, Little Rock, Ark., *Supt.;* W. A. Adams, Little Rock, Ark., *Engr.;* Bert Smith, Shreveport, La., *Supt.;* Roscoe Campbell, Shreveport, La., *Asst. Supt.*

New-Business Division—Gas Distribution.

W. J. McIntyre, *Mgr., Southern Div.;* R. W. Curran Little Rock, Ark., *Mgr., Northern Div.* 1,643 miles, 2 to 20-in.; 67 miles, 8 and 10-in. leased; 7 miles, 2 to 4-in., one-half interest; 9 miles, 2 to 12-in. leased to others.

Arkansas Natural Gas Corp., Shreveport, La.

D. W. Harris, *V. P.* and *Gen. Mgr.;* P. R. Jones, H. D. Hancock, and J. R. Munce, *V. P.s;* T. J. Heard, *Sec.;* B. R. Muirhead, *Treas.;* W. H. Buckley, *Supt., Gas Pipe-Line Div.;* Paul Weeks, *Prod. Supt., Gas Pipe-Line Div.;* J. Lucas, *Mgr. of Purchases;* H. T. Goss, *Ch. Engr.* 51 miles, 10-in. leased to others.

Arkansas Western Gas Co., 1104 Burt Bldg., Dallas, Tex.

Albert S. Johnson, *Pres.;* C. H. Zachry, F. W. Smith, Ross Byron, and L. L. Baxter, *V. P.s;* H. V. McConkey, *Sec.;* C. H. Zachry, *Treas.;* James C. Reid, *Engineering Dept.;* Van Thompson, *Measurement Dept.;* F. D. Bradley, *Pur. Agt.;* Scott Hughes, *Legal Dept.;* H. V. McConkey, *Accounting Dept.;* L. L. Baxter, Fayetteville, Ark., *Dist. Mgr.;* Bill Dalton, Bentonville, Ark.; E. Allumbaugh, Rogers, Ark.; Carl Watson, Siloam Springs, Ark.; Bob Black, Springdale, Ark., *Plant Mgrs.* 122 miles, 2 to 10-in.

B

Bellewood and Monongahela City Natural Gas Co., 113 Fourth St., Monongahela, Pa.

Robert W. Byers, *Pres.;* E. W. Gibbons, *V. P.* and *Gen. Mgr.;* R. Edwin Byers, *Sec.;* George B. Scott, *Treas.;* W. E. Leathers, *Supt., Transmission and Distribution* and *Asst. Sec.;* John Caldwell, *Head of Meter Dept.;* Weaver L. Bush, *Engr.* 65 miles, 1 to 10-in.

Big Horn Gas Co., Basin, Wyo.

P. G. Weidner, *Pres.;* John McFadyen, *V. P.;* John F. Cullen, *Sec.;* T. K. Bishop, *Treas.* and *Mgr.;* L. G. Merriott, *Asst. Sec.* and *Supt.;* I. E. Spencer, *Foreman.* 86 miles, 8 to 14-in.

Billings Gas Co., Billings, Mont.

W. M. Holland, *Pres.;* J. E. Moore, E. B. Redpath, G. E. Snell, *V. P.s;* C. A. Trowbridge, *Sec.;* J. A. Lee, *Treas.;* J. E. Moore, *Gen. Mgr.* and *Supt.;* Elmer Nielson, *Asst. Supt.* 101 miles, 8 to 12-in.

C

Cabot, Godfrey L., Inc., 77 Franklin St., Boston, Mass.

Godfrey L. Cabot, *Pres.;* Ralph Bradley and Edmund Billings, *V. P.s;* Fred C. Fernald, *Sec.;* Thomas D. Cabot, *Treas.;* Hugh Burdette, Charleston, W. Va., *Eastern Mgr.;* W. P. Smith, Charleston, W. Va., *Gen. Supt. for W. Va.;* George Cash, Wellsville, N. Y., *Gen. Supt. for N. Y. and Pa.* 1,200 miles, 2 to 24-in.

Canadian River Gas Co., Colorado Springs, Colo.

N. K. Moody, Tulsa, Okla., *Pres.;* P. C. Spencer New York City; R. E. Wertz, Amarillo, Tex.; Albert R. Jones, Kansas City, Mo., *V. P.s;* Robert W. Hendee, *Gen. Mgr.;* George Baird, New York City, *Sec.-Treas.;* J. O. Shields, *Asst. Treas.;* R. A. Ford, Amarillo, Tex., *Gen. Supt.;* Max K. Watson, Amarillo, Tex., *Asst. Gen. Supt.;* E. H. Aderton, Amarillo, Tex., *Prod. Supt.;* R. W. Miller, Amarillo, Tex., *Field Line Supt.;* L. W. Jackson, Channing, Tex., *Supt. Compressor Stations,* Bivens Sta.; V.E. Dominick, Dalhart, Tex., *Ch. Engr.,* Dalhart Sta.; J. L. Hathaway, Amarillo, *Telephone Foreman;* L. B. Whitefield, *Pur. Agt.;* G. F. Brunston, *Ch. Engr.* 267 miles, 2 to 22-in.

Canadian Western Natural Gas, Light, Heat & Power Co., Ltd., 215 Sixth Ave., W., Calgary, Alta., Canada

H. R. Milner, *Pres.;* E. W. Bowness, *V. P.* and *Managing Dir.;* H. S. Watts, *Sec.-Treas.;* P. D. Mellon, *Gen. Supt.;* H. W. Francis, *Pur. Agt.;* F. A. Smith, *Comptroller;* F. J. Heuperman, *Eng. in Chg.;* W. Lloyd McPhee, *Ch. Accountant;* F. Harrison, *Transmission Supt.;* J. J. Morrison, *Supt.,* Lethbridge Dist.; H. E. Timmins, *New Business Mgr.;* Miss Elsie M. Currie, *Home Service Dir.;* N. D. McKinnon, *Shop Supt.;* J. T. Milne, *Internal Auditor;* S. C. Murison, *Office Mgr.* 332 miles, 2 to 16-in. transmission lines. 305 miles, 2 to 10-in. distribution lines.

Canton Municipal Utilities, Canton, Miss.

W. M. Reid, *Supt.* 21 miles, 6⅝-in.

Carnegie Natural Gas Co. and subsidiary, Apollo Gas Co., 1014 Frick Bldg., Pittsburgh, Pa.

D. S. Keenan, *Pres.;* James W. Hamilton, *Sec.;* P. L. Kesel, *Treas.;* Clarence Sweeney, *Gen. Supt.;* H. L. Applegate, *Ast. to Pres.;* Paul D. Ingram, Waynesburg, Pa., *Div. Supt.;* Rex P. Milliken, Box 387, Mannington, W. Va., *Div. Supt.;* W. O. Spitznogle, Box 387, Mannington, W. Va., *Supt. of Compressing Stations.* 1,540 miles, 1 to 30-in.

Central Gas Utilities Co., Abilene, Kans.

W. S. Morrison, *Pres.;* R. B. Gemmill, *V. P.;* M. C. Beamer, *Sec.;* O. D. Small, *Treas.;* Ross Beach, Hays, Kans., *Dist. Mgr.;* H. E. Waring, Lamar, Colo., *Dist. Mgr.;* Jack Earl, Hays, Kans., *Gas Supt.;* Ray L. Broughton, Lamar, Colo., *Service Man.* 270 miles, 6-in.

Central States Power & Light Corp., 700 Oklahoma Bldg., Tulsa, Okla.

W. F. Hebeler, *V. P.;* E. C. Brown, *Sec.;* W. Smith, *Treas.;* Paul K. Sticelber, *Div. Mgr.;* W. R. Kubista, *Div. Engr.;* C. H. Rich, Clinton, Okla.; A. H. Burgess, Henryetta, Okla.; A. L. McGaugh, Stillwater, Okla.; J. W. Garman, Pampa, Tex.; LaVan Warren, Quinton, Okla., *Dist. Mgrs.;* M. V. Davies, Wetumka, Okla., and Frank Rhoades, Quinton, Okla., *Plant Supts.;* Ray Dunn, *Station Mgr.*

Chicago District Pipeline Co., Joliet Bldg., Joliet, Ill.

George F. Mitchell, *Pres.;* William G. Rudd, *V. P.* and *Comptroller;* A. C. MacArthur, *Asst. Comptroller* and *Regional Agent;* Eskil I. Bjork, *Asst. Comptroller;* J. A. Cunningham, *Sec.* and *Asst. Treas.;* William R. Weldon, *Treas.* and *Asst. Sec.;* W. R. C. Galloway, *Asst. Sec.-Treas.;* Charles J. Hill, *Auditor;* Frank J. O'Connell, 122 South Michigan Ave., Chicago, Ill., *Gen. Supt.;* John M. O'Connor, R.F.D. No. 1, Joliet, Ill.; Nicholas A. Manfred, R.F.D. No. 1, Joliet, Ill., *Meter Station Supervisors.* 79 miles, 12 to 24-in.

Cimarron Utilities Co., Box 631, Borger, Tex.

Chester C. Smith, *Pres.;* Robert M. Rainey, Jr., and John H. Lucas, *V. P.s;* H. C. Davis, *Sec.-Treas.;* C. R. Stahl, *Gen. Mgr.;* L. J. Roberts, *Asst. Gen. Mgr.;* K. E. Sharp, Texhoma, Okla., *Supt.* 130 miles, 2 to 5½-in.

Cities Service Gas Co., Bartlesville, Okla.

H. R. Straight, *Pres.;* A. W. Ambrose and George H. Baird, *V. P.s;* W. R. Morton and G. C. Roth, *Asst. Secs.;* A. C. Kleinschmidt, *Asst. Treas.;* C. D. Rogers, *Supt. of Operations;* F. D. Frank, *Supt. of Prod.* H. B. Milam, *Supt. of Transmission;* R. W. Hofsess, *Supt. of Pipe Lines;* F. D. Renfro, *Supt. of Compressor Stations;* E. E. Lambe, *Ch. Pressure Dispatcher;* J. W. Flint, *Supt. of Tel. and Tel.;* P. E. Ernst, *Supt. of Motor Transportation;* G. A. Gibson, *Supt. of Gas Measurement;* C. C. Hoffman, *Supt. of Land, Lease and Geological Dept.;* R. E. Warnick, *Pur. Agt.;* R. T. Wells, *Ch. Engr.*

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Compressor-Station Department.

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E. E. Du Vall, New York City, *Sec.;* James Comerford, New York City, *Treas.;* J. O. Shields, *Asst. Treas.;* J. P. McClintock, *Gen. Supt.;* G. F. Brunston, *Ch. Engr.;* L. B. Whitefield, *Pur. Agt.;* Troy M. Odom, *Telephone Supt.;* W. R. Beardsley, *Supt. Meter Dept.;* J. M. Boggs, *Div. Supt.;* J. J. Dolan, Delhi, Colo., *Div. Supt.;* B. R. Wilson, Box 276, Pueblo, Colo., *Ch. Engr.,* Devine Sta.; John W. Hopkins, Model, Colo., *Ch. Engr.,* Canyon Sta.; E. E. Regan, Clayton, N. M., *Ch. Engr.,* Clayton Sta. 428 miles, 2 to 22-in.

Colorado Wyoming Gas Co., 407 Continental Bldg., Denver, Colo.

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Cut Bank Utilities, Cut Bank, Mont.

Jerome L. Drumheller, 502 Columbia Bldg., Spokane, Wash., *Owner;* D. M. Drumheller, Jr., *Mgr. of Operations;* A. Coleman, *Gen. Foreman;* Charles J. Bresee, Jr., *Office Mgr.* 26 miles, 1 to 4-in.

D

Dominion Natural Gas Co., Ltd., 518 Jackson Bldg., Buffalo, N. Y.

S. B. Severson, *V. P.* and *Gen. Mgr.;* J. A. Ritchie, *Sec.-Treas.;* D. P. Spencer, *Asst. Sec.;* D. A. Hamilton, *Asst. Treas.;* C. F. Henderson, St. Catharines, Ont., Canada; C. H. Lutz, Dunnville, Ont., Canada; F. D. Howell, Brantford, Ont., Canada; L. D. Burdick, St. Thomas, Ont., Canada; W. J. Marriott, Leamington, Ont., Canada, *Div. Supts.;* G. M. Merrill, *Ch. Engr.;* W. H. Hott, *Measurement Engr.;* F. Fair, *Supt. of Prod.* 854 miles, 2 to 12-in. main lines; 605 miles, 2 to 10-in. distribution lines.

E

East Ohio Gas Co., 1405 East Sixth S , Cleveland, Ohio.

C. E. Gallagher, *Pres.;* W. G. Hagan and W. G. Rogers, *V. P.s;* P. F. Leusch, *Sec.-Treas.;* W. G. Hagan, *Gen. Mgr.;* G. W. Horsley, *Gen. Supt.;* G. P. Binder, *Supt.,* Cleveland Plant; J. F. Gray, *Ch. Engr.;* A. T. Code, *Pur. Agt.* 1,375 miles production and transmission lines; 5,249 miles distribution lines.

El Paso Natural Gas Co., Bassett Tower, El Paso, Tex.

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Empire Southern Gas Co., Box 111, Alexandria, La.

R. W. Rea, *Pres.;* F. H. Coughlin and James A. Davis, *V. P.s;* J. G. McClellan, *Sec.-Treas.;* J. P. Kenney, Big Spring, Tex.; Ernst Tetens, Brady, Tex.; C. L. Ponder, Gorman, Tex.; Jasper Goodwill, Minden, La.; C. C. Redding, Clarksville, Ark., *Dist. Mgrs.;* F. Charles Landers, Jr., Big Spring, Tex., and R. W. Adams, Minden, La., *Dist. Supts.;* B. P. Ledbetter, Big Spring, Tex., *Engr.* 250 miles.

Equitable Gas Co., 435 Sixth Ave., Pittsburgh, Pa.

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F

Fidelity Gas Co., Aliquippa, Pa.

W. S. Kidd, Jr., *Pres.;* W. A. Bliss, *V. P.* and *Treas.;* J. C. Wright, *Engr.;* D. L. Short, *Supt.* 4 miles.

Frankfort Kentucky Natural Gas Co., Lexington, Ky.

D. L. Hazelrig, *Pres.;* J. E. Harting, *V. P.;* T. J. Tonkin, Jr., *Sec.-Treas.* and *Gen. Mgr.* 33 miles, transmission lines; 44 miles, distribution lines.

H

Hamilton Gas Corp., Charleston, W. Va. (and subsidiaries, Larner Gas Co. and Thompson Gas Co.)
E. M. Watters, *V. P.* and *Sec.;* R. M. Craigmyle, *V. P.* and *Treas.;* Clinton Neff, *Asst. Sec.-Treas.*

Home Pipe Line Co., First Nat'l. Bank Bldg., Cushing, Okla.
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Hope Natural Gas Co., 445 West Main St., Clarksburg, W. Va.
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I

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Inland Gas Corp., 1409 Winchester Ave., Ashland, Ky.
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K

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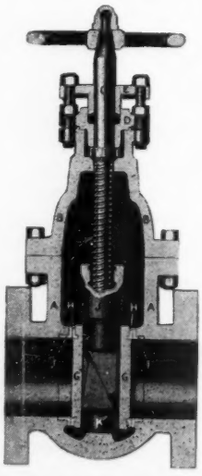

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L

La Flore County Gas & Electric Co., Poteau, Okla.

Charles T. Orr, *Pres.;* Raymond F. Orr, *V. P.;* C. B. Saviers, *Sec.-Treas.;* James F. Orr, *Ch. Engr.;* H. A. Sickman, *Field and Drilling Supt.;* G. F. Allen, *Gas Engr.* 84 miles, 6 and 8-in.; 16 miles, 4-in. leased.

Lion Oil Refining Co., Exchange Bldg., El Dorado, Ark.

Col. T. H. Barton, *Pres.;* T. M. Martin, A. F. Reed, J. J. Allinson, and J. E. Howell, *V. P.s;* Jeff Davis, *Sec.;* R. E. Meinert, *Treas.;* J. E. Howell, *V. P., Chg. of Prod. and Pipe Lines;* E. W. Hardage, *Gen. Supt., Prod. and Pipe Lines;* Joe B. Tims, *Pipe Line Supt.;* J. D. Kendrick, *Ch. Gager;* V. M. Speer, *Pipe Line Connection Foreman;* J. L. Nutt and J. D. Herring, *Pump Repairmen;* L. O. Preddy, J. E. Coley, Sr., and V. E. Vaulbree, *Station Engrs.;* J. L. Greene, *Dist. Gager,* El Dorado; D. C. Ellen, *Dist Gager,* Schuler. 22 miles.

Live Oak Gas Co., Three Rivers, Tex.

Henderson Coquat, *Pres.;* A. F. Moore, *V. P.;* J. K. Montgomery, *Sec.;* Ralph Robinson, *Sales Mgr.* and *Comptroller.* 6 miles, 3-in.

Lone Star Gas Co., 1915 Wood St., Dallas, Tex.

D. A. Hulcy, *Pres.;* R. A. Crawford and E. F. Schmidt, *V. P.s;* D. L. Cobb, *Sec.-Treas.;* J. L. Foster, *Supt.;* R. Vandercook, *Pipe Line Supt.;* L. Tolbert, *Asst. Pipe Line Supt.;* James T. Bickley, Box 498, Ballinger, Tex.; Mark Black, Box 398, Healdton, Okla.; Aubrey Boyd, Route 1, Cayuga, Tex.; J. N. Carpenter, Box 567, Gainesville, Tex.; W. F. Crook, Box 1313, Abilene, Tex.; L. E. DePew, Box 349, Shamrock, Tex.; Eldon Glenn, Route 5, Box 632, Waco, Tex.; J. A. Martin, Box 1680, Vernon, Tex.; George Minton, Box 88, Joshua, Tex.; Tod Pazdral, Box 365, Irving, Tex.; E. K. Smith, Box 78, Ranger, Tex.; Fred C. Smith, Box 253, Petrolia, Tex.; Lloyd E. Southard, Box 348, Groesbeck, Tex.; T. E. Waddill, Route 6, Box 553, Fort Worth, Tex.; W. G. Webb, Box 124, Gordon, Tex., *Pipe Line Div. Foremen;* C. W. Cardwell, Box 107, Ranger, Tex.; M. W. Crowder, Box 88, Joshua, Tex.; S. M. Gamble, Box 78, Ranger, Tex.; W. E. Johns, Box 398, Healdton, Okla.; Ralph Ship, Petrolia, Tex., *Compressor Dept.;* B. L. Rogers, *Compressor Supt.;* O. H. Moore, *Asst. Compressor Supt.;* C. O. Diller, *Telephone Dept.;* A. W. Breeland, *Supervisor of Safety;* W. A. Allred, *Asst. Supervisor of Safety;* J. A. Martin, *Supervisor of Transmission and Maintenance;* D. A. Sillers, *Supt., Gas Measurement Dept.;* E. E. Stovall, *Asst. Supt., Gas Measurement Dept.;* T. B. Long, *Ch. Dispatcher;* R. A. Minter, *Office Engr.;* John Vigiini, *Asst. Office Engr.;* W. L. Carter, *Automobile Supervisor;* Harry Henry, Lone Star Gasoline Co., Ranger, Tex., *Fleet Supervisor.* 4,334 miles, 2 to 24-in.; 95 miles, 10-in. leased.

Lone Star Gasoline Co., 1915 Wood St., Dallas, Tex.

D. A. Hulcy, *Pres.;* E. F. Schmidt, *V. P.* and *Operating Mgr.;* R. A. Crawford, *V. P.;* D. L. Cobb, *Sec.-Treas.;* J. R. Jarvis, *Gen. Supt.;* Harry Wheeldon, *Asst. Gen. Supt.;* J. M. Kindle, Box 341, Ranger, Tex.; J. A. Bates, Box 1452, Breckenridge, Tex., *Dist. Supts.;* J. L. Hamilton, Box 236, Grapeland, Tex.; W. A. Robinson, Box 236, Trinidad, Tex; J. F. Francis, Route 1, Cisco, Tex., *Plant Supts.;* F. H. Townsend, Gordon, Tex.; J. M. Phillips, Petrolia, Tex.; H. C. Wells, Hollis, Okla., *Plant Supts.;* Lone Star Gas Co. 294 miles, 2 to 16-in.

Louisiana Nevada Transit Co., 1517 Magnolia Bldg., Dallas, Tex.

W. A. Delaney, Jr., *Chm. Bd.;* T. R. Jones, *Pres.;* M. O. Matthews, *Sec.-Treas.;* W. Mike Murphy, *Operations Mgr.;* Martin A. Gehling, *Supt.,* Arkansas Division; Charles D. Perkins, *Supt.,* Louisiana Division; R. E. Moreland, *Asst. Sec.-Treas.;* Vernon Roberts, *Asst. Ch. Counsel.* 95 miles, 4 to 8-in.

M

Mars Co., 308 Seneca St., Oil City, Pa.

George E. Welker, *Pres.;* A. C. Burwell, *V. P., Chg. of Engineering;* J. B. Montgomery, *V. P., Chg. Prod.;* H. S. Rose, *Sec.-Treas.;* M. J. Connor, *Pur. Agt.*

Memphis Natural Gas Co., 931 Sterick Bldg., Memphis, Tenn.

B. L. Johnson, *Pres.;* H. C. Wallace and H. P. Farrington, *V. P.s;* M. A. Phillips, *Sec.;* A. C. Dearth, *Treas.;* M. B. Higman, *Ch. Engr.;* C. H. Bryan, Benoit, Miss., *Supt., Compressor Stations;* W. G. Scott, Benoit, Miss.; G. F. Mosby, Fairbanks, La.; P. M. Benson, Wilmot, Ark.; Fred Lynch, Lula, Miss., *Station Engrs.;* L. W. Campbell, *Supt. of Transmission Lines;* L. F. Newton, Eudora, Ark.; M. M. Seale, Clarksdale, Miss.; C. W. Mabry, Memphis, Tenn., *Div. Foremen;* W. J. Brothers, *Supt. of Measurement;* W. H. Edmiston, *Ch. Dispatcher.* 371 miles, 3½ to 18-in.

Mercer County Gas Co., 308 Seneca St., Oil City, Pa.

George E. Welker, *Pres.;* A. C. Burwell, *V. P.;* H. S Rose, *Treas.;* P. L. Mulkin, *Supt. of Distribution,* M. J. Connor, *Pur. Agt.*

Mississippi River Fuel Corp., 407 North Eighth St., St. Louis, Mo.

F. H. Lerch, Jr., New York City, *Pres.;* Ben C. Comfort, *V. P.* and *Mgr.;* Reid L. Carr, New York City, *Sec.;* James Comeford, New York City, *Treas.;* A. W. Sommerville, *Asst. to V. P.* and *Mgr.;* H. D. Graham, *Ch. Engr.;* J. W. Peisker, *Pur. Agt.;* A. W. Joiner, *Supt., Compressor Stations;* Roy Gibson, Pine Bluff, Ark., *Asst. Supt., Compressor Stations;* K. A. Bosmyer, *Supt., Measurement;* R. W. Bargar, Popular Bluff, Mo.; A. E. Rose, Pine Bluff, Ark., *Div. Supts.;* A. G. Hoge, Bastrop, La., *Engr.;* A. B. Willey, Crossett, Ark.; J. C. Lemon, Wilmar, Ark.; R. W. Hollis, Carlisle, Ark.; J. G. Reese, Newport, Ark.; J. N. Hart, Poplar Bluff, Mo.; C. R. Garrett, Zion, Mo.; J. A. Sullivan, Farmington, Mo., *Div. Foremen;* J. H. Young, Bastrop, La.; T. C. McLellan, Star City, Ark.; R. E. Baum, West Point, Ark.; B. B. Bush, Biggers, Ark.; H. M. Gillespie, Zion, Mo.; E. T. Webb, Newport, Ark.; E. C. Collins, Sherrill, Ark.; E. H. Richardson, Crossett, Ark., *Station Engrs.* 457 miles, 16 and 22-in. transmission lines; 227 miles, 2 to 16-in. distribution lines.

Monongahela West Penn Public Service Co., Fairmont, W. Va.

A. C. Spurr, *Pres.;* O. F. Lough, J. K. Buchanan, and C. H. Leatham, *V. P.s;* G. J. Jackson, *Sec.;* O. F. Lough, *Treas.;* G. W. Harr, *Mgr., Gas Dept.;* H. C. Ice, *Geologist;* K. H. Bane, *Supt.. Compressor Stations;* J. R. Henderson, *Supt., Distribution;* J. W. Allison, Morgantown, W. Va., *Gen. Supt.;* T. K. Heck, *Supt. of Meters;* L. N. Snoderly, *Foreman;* R. G. Crawford, Morgantown, W. Va., *Field Supt.;* M. D. Baremore, Morgantown, W. Va., *Ch. Engr.* 431 miles, 2 to 8-in.

Montana-Dakota Utilities Co., 831 Second Ave. South, Minneapolis, Minn.

C. C. Yawkey, Wausau, Wis., *Pres.;* R. M. Heskett, *V. P.;* Ben Alexander, Conway Bldg., Chicago, Ill., *V. P.;* A. P. Woodson, Wausau, Wis., *Sec.;* F. R. Gamble, *Treas.;* Cecil W. Smith, *Ch. Engr.;* H. M. Frederickson, *Gas Engr.;* A. F. Anderson, *Pur. Agt.;* James Trimble, Bismark, N. D.; C. B. Aasness, Rapid City, S. D.; L. M. Wells, Sheridan, Wyo.; Robert Naylor, Miles City, Mont.; Noel Carrico, Glendive, Mont.; O. H. Bundy, Glasgow, Mont.; F. S. Marion, Havre, Mont.; Harlan Scott, Great Falls, Mont.; V. M. Cleaveland, Williston, N. D.; A. J. Ensteness, Missoula, Mont.; Ivan J. Swanson, Crookston, Minn., *Div. Mgrs.;* H. A. Schroth, Baker, Mont.; Clyde Keys, Shelby, Mont., *Gas Field Supts.* 1,085 miles, 2 to 12-in.

Mountain Fuel Supply Co., 539 South Main St., Findlay, Ohio

T. B. Gregory, *Chm. Bd.* and *Treas.;* O. D. Donnell, *Pres.;* C. R. Hetzler, J. D. Roberts, and H. H. West, *V. P.s;* F. B. Firmin, *Sec.* and *Asst. Treas.;* L. C. Olpin, *Asst. Sec.-Treas.* 400 miles, 3 to 18-in. transmission lines.

Mountain States Gas Co., 35 East Wacker Drive, Chicago, Ill.

D. D. Irwin, *Pres.;* Henry Hauseman and H. J. Lowe, *V. P.s;* C. H. Jay, *Sec.-Treas.;* J. H. Botkin, *Comptroller;* D. E. Sullivan, *Ch. Engr.;* J. A. Waggoner, Dawes, W. Va., *Gen. Mgr.;* C. V. Conner, Cabin Creek, W. Va., *Supt.* 5 miles, 1 and 2-in.

N

Natural Gas Pipeline Co. of America, 20 North Wacker Drive, Chicago, Ill.

W. A. Jones, *Pres.;* Floyd C. Brown, *V. P.;* S. E. Campbell, *Sec.* and *Asst. Treas.;* E. V. Kesinger, *Gen. Supt.;* G. M. Davidson, *Supt. of Operations* and *Ch. Engr.;* L. E. Biggs, *Pur. Agt.;* R. G. Strong, *Supt. of Pipe Lines;* W. H. Davidson, *Supt. of Compressor Stations;* W. T. Bulla, *Supt. of Telephone and Pressure;* E. D. Warren, Harper, Iowa; H. E. Smith, Heizer, Kans., *Div. Supts.;* W. E. Warner, Sta. 2, Gray, Okla.; J. G. Barnhart, Sta. 3, Minneola, Kans.; C. C. Jolley, Sta. 4, Heizer, Kans.; H. C. Taintor, Sta. 5, Glasco, Kans.; E. C. Marsh, Sta. 6, Beatrice, Neb.; D. B. Sprow, Sta. 7, Hastings, Iowa; F. F. Graham, Sta. 8, Truro, Iowa; H. R. Rohweder, Sta. 9, Harper, Iowa; R. M. Hendry, Sta. 10, Geneseo, Ill., *Supts.;* M. V. Burlingame, Heizer, Kans.; M. J. Cook, Beatrice, Neb.; L. S. Duddleston, Truro, Iowa; D. C. Palm, Geneseo, Ill., *Dist. Supts.* 823 miles, 24-in.

New Mexico Eastern Gas Co., 1104 Burt Bldg., Dallas, Tex.

Albert S. Johnson, *Pres.;* C. H. Zachry, F. W. Smith and J. R. Cole, *V. P.s;* H. V. McConkey, *Sec.;* C. H. Zachry, *Treas.;* F. D. Bradley, *Pur. Agt.;* James C. Reid, *Engr.;* Van Thompson, *Measurement Dept.;* Scott Hughes, *Legal Dept.;* H. V. McConkey, *Accounting Dept.;* J. R. Cole, Santa Fe, N. M., *Gen. Mgr.;* E. W. Kelley, Clovis, N. M.; H. N. Oldham, Carlsbad, N. M., *Dist. Mgrs.;* J. D. Jackson, Portales, N. M.; Horace Echols, Tucumcari, N. M.; E. C. Reddy, Carlsbad, N. M.; Charles Gaskins, Artesia, N. M., *Town Plant Mgrs.* 246 miles, 2 to 8-in.

New Mexico Gas Co., Burt Bldg., Dallas, Tex.

Albert S. Johnson, *Pres.;* J. R. Cole, Ross Byron, F. W. Smith, and C. H. Zachry, *V. P.s;* H. V. McConkey, *Sec.;* C. H. Zachry, *Treas.;* J. H. Wilson, Santa Fe, N. M., *Dist. Mgr.;* O. B. Peacore, Albuquerque, N. M., *Main Line Supt.;* J. R. Cole, Santa Fe, N. M., *Operating Mgr.;* J. D. Reid, *Supt., Land and Lease Div.;* J. C. Reid, *Gen. Supt., Engineering Dept.* 268 miles, 4 to 12-in.

New York State Natural Gas Corp., 545 William Penn Way, Pittsburgh, Pa.

J. French Robinson, *Pres.;* F. H. Lerch, Jr., and J. C. Trees, *V. P.s;* E. E. Du Vall, *Sec.;* S. J. Ratcliffe, *Treas.;* E. C. Ingham, Box 65, Lawrenceville, Pa., *Dist. Supt.;* A. C. Boyer, Box 129, Lawrenceville, Pa., *Dist. Engr., Station Dept.* 266 miles, up to 20-in.

North East Heat & Light Co., 16 North Lake St., North East, Pa.

Stephen T. Lockwood, *Pres.;* Robert I. Thompson, 218 Center St., East Aurora, N. Y., *Treas.* and *Supervising Mgr.;* John G. Watt, *Local Representative.* 7 miles, 1 to 2-in. field and transmission lines; 14 miles, 1 to 8-in. distribution lines.

Northern Natural Gas Co., Aquila Court Bldg., Omaha, Neb.

B. R. Bay, *Pres.;* H. J. Carson, *V. P.;* J. F. Merriam, *Sec.-Treas.* and *Asst. to Pres.;* A. B. Dilworth, *Comptroller* and *Asst. Treas.;* R. J. Organ, *Gen. Counsel;* B. H. Harper, *Asst. Sec.;* H. J. Carson, *Ch. Engr.;* J. P. Bristow, *Asst. Ch. Engr.;* S. W. Taft, *Supt. of Transmission;* John M. Hanley, *Prod. Engr.;* C. F. Martin, *Pur. Agt.;* R. L. Harrison, *V. P.* and *Supt. of Distribution*—Peoples Natural Gas Co. and Argus Natural Gas Co., Inc. 2,758 miles, 2 to 26-in. (including Argus lines).

Northern Oklahoma Gas Co., Box 511, Ponca City, Okla.

L. A. Farmer, *Pres.;* J. A. Shobe, *Supt.;* D. J. Fulton, Newkirk, Okla., *Local Mgr.;* Keith McQuiston, Perry, Okla., *Local Mgr.* 161 miles, 2 to 10-in.

Northern Utilities Co., Casper, Wyo.

J. H. McIntire, *Pres.;* W. A. Blind, *V. P.* and *Treas.;* C. H. Lavin, *V. P.;* R. E. Burke, *Sec.;* L. E. Hoadley, *Asst. Sec.-Treas.* 237 miles, transmission lines; 107 miles, distribution lines.

Northwestern Natural Gas Co., Grandview, Wash.

R. B. Newbern, *Pres.;* Louis Hoefle, *Sec.-Treas.;* Erik H. Nelson, *Trustee;* Earle Tinius, *Mgr.;* J. H. Mann, *Prod. Supt.;* Merle Mann, *Distribution.* 48 miles, 3 to 10-in.

Northwestern Ohio Natural Gas Co., 99 North Front Street, Columbus, Ohio

C. I. Weaver, *Pres.;* E. M. Tharp and T. H. Kerr, *V. P.s;* P. A. Alberty, *Sec.;* W. N. Grinstead, *Treas.;* I. A. Ludwig, C. F. Cramer, and C. C. Johnson, 231 Huron St., Toledo, Ohio. 579 miles.

Northwestern Utilities, Ltd., 10124 104th St., Edmonton, Alta., Canada

H. R. Milner, *Pres.;* E. W. Bowness, *V. P.* and *Managing Dir.;* Julian Garrett, *Gen. Mgr.;* J. B. Whelihan, *Sec.-Treas.;* E. F. McGarvey, *Asst. to Gen. Mgr.;* G. W. Green, *Gen. Supt.;* E. Nelson, *Ch. Engr.;* R. C. McPherson, *New Business* and *Service Mgr.;* A. J. Danes, *Distribution Supt.;* F. G. Imler, *Transmission Supt.;* H. R. Brooke, *Field Supt.;* R. F. Allan, and B. W. Pitfield *Asst. Engrs.* 130 miles, 10 and 12-in. transmission lines; 195 miles, 1¼ to 12-in. distribution and field lines.

O

Ohio Fuel Gas Co., 99 North Front St., Columbus, Ohio.

C. I. Weaver, *Pres.;* E. M. Tharp, T. H. Kerr, and W. L. McCloy, *V. P.s;* P. A. Alberty, *Sec.;* W. N. Grinstead, *Treas.;* C. L. Langenberg, C. C. Phillips, J. H. Lang, A. M. Hutchinson, D. R. Croft, S. A. Chadwell, D. B. Walker, Columbus, Ohio, *Operating Personnel;* C. L. Leibengood, Harding Way, West, Galion, Ohio; W. C. Gundelfinger, Masonic Bldg., Athens, Ohio; S. I. Parcell, 202 North Market St., Wooster, Ohio; R. D. Weaver, Box 325, Athens, Ohio; G. J. Baxter, Pavonia, Ohio; John Adams, Box 645, Sugar Grove, Ohio; Lester D. Myers, Homer, Ohio; E. C. Overbeck, Columbus, Ohio; C. Ray Adams, Box 37, Wooster, Ohio; H. C. Simmons, Box 428, Mount Vernon, Ohio; J. F. King, Box 369, Cambridge, Ohio; Ralph C. Frary, Box 645, Sugar Grove, Ohio; E. W. Bailey, 118 Depot St., Athens, Ohio; H. M. Cox, Box 37, Wooster, Ohio; H. C. Heflinger, 319 West State St., Fremont, Ohio; C. F. Bronson, 528 Broad St., Elyria, Ohio; W. C. Mead, 66 Park Ave., West, Mansfield, Ohio; G. K. Schooler, 509 South Main St., Findlay, Ohio; P. G. Miller, 101 North Fountain Ave., Springfield, Ohio; F. S. Williams, 99 North Front St., Columbus, Ohio; H. M. Jay, 32 West Main St., Newark, Ohio; H. W. Baker 918 Wheeling Ave., Cambridge, Ohio; F. W. Phillips, 50 South Court St., Athens, Ohio, *Operating Personnel.* 11,315 miles.

Oklahoma Natural Gas Co., P.O. Box 871, Tulsa, Okla.

Joseph Bowes, *Pres.;* C. U. Daniels, R. C. Allen, and Frank B. Long, *V. P.s;* George Frederickson, Oklahoma City, Okla., *V. P.;* F. W. Peters, *Sec.-Treas.;* O. L. Jones, *Asst. Sec.-Treas.;* Ruth Canady, *Asst. Sec.;* R. R. Allen, *Asst. Sec.;* Robert W. Ducker, *Gen. Supt.;* O. L. Jones, *Accounting;* E. J. McConnell, *Engineering;* Frank B. Long, *Land and Lease;* Gilbert Estill, *Gas Measurement;* W. A. Noel, *Purchasing;* J. H. Warden, *Sales; Department Heads:* Jack Gillis, Ardmore, Okla.; C. R. Shiers, Enid, Okla.; W. G. Van Arsdale, Muskogee, Okla.; C. M. Van Slyke, Okmulgee, Okla., (*Mgr.* and *Supt.*); T. A. Wood, Oklahoma City, Okla.; Lee Prokop, Shawnee, Okla.; W. A. Hazard, Tulsa, Okla., *Dist. Supts.* 4,038 miles, 2 to 16-in. (exclusive of service lines).

Oklahoma Power & Water Co., Sand Springs, Okla.

J. C. Happenny, *Pres.;* T. E. Mansfield, *V. P.;* T. S. Matthews, *Sec.;* C. F. Colvin, *Treas.;* H. H. Young, *Gas Supt.;* C. P. Pyeatte, *Gas Engr.;* L. O. Wilson, *Foreman;* W. R. Harrell, Osage, Okla., *Foreman.* 179 miles, up to 10-in.

Oklahoma Utilities Co., 123 West Seventh, Bristow, Okla.

F. H. Coughlin, *Pres.;* R. C. Poage, *V. P.;* J. G. McClellan, *Sec.-Treas.;* J. L. Miller, *Asst. Sec.-Treas.;* J. A. Whitcomb, *Field Supt.;* A. C. Wright, *Gasoline Plant Supt.* 98 miles, 3-in. equivalent, transmission lines; 58 miles, 3-in. equivalent, distribution lines.

Ottumwa Gas Co., P.O. Box 362, Ottumwa, Iowa.

R. B. MacDonald, *Pres.;* L. H. Heinke, R. F. Hennaman, and H. B. Munsell, *V. P.s;* L. H. Heinke, *Sec.;* C. P. Van Dyke, *Treas.;* C. S. Davis, *Supt., Distribution;* A. E. Shoemaker, *Service Dept.;* E. R. Grau, *Sales Mgr.;* O. F. Knott, *Industrial and Heating Engr.* 115 miles, ¾ to 16-in.

P

Pacific Gas & Electric Co., 245 Market St., San Francisco, Calif.

J. B. Black, *Pres.;* P. M. Downing, *V. P.* and *Gen. Mgr.;* A. E. Wishon, *V. P.* and *Asst. Gen. Mgr.;* J. P. Coghlan, *V. P.* and *Asst. to Pres.;* W. G. Vincent, *V. P.* and *Exec. Engr.;* R. E. Fisher, *V. P., Chg. Public Relations* and *Sales;* R. S. Fuller, *Engr. of Operations;* F. F. Doyle, *Mgr., Natural Gas Div.,* F. Wills, *Engr. of Prod.;* H. J. Smith, *Engr. of Construction.* Coast Valleys Div., Salinas, Calif.: G. A. Peers, *Div. Supt.;* S. A. Wright, *Asst. Div. Supt., Gas and Water;* E. K. Gwynn, *Foreman, Gas Dept.* Coalgate Div., Marysville, Calif.: A. Cunningham, *Div. Supt., Gas Dept.* De Sabla Div., Chico, Calif.: D. D. Smith, *Supt., Gas Dept.* Drum Div., Auburn, Calif.: L. G. Roberts, *Div. Supt., Elec. and Gas Dept.* East Bay Div., Oakland, Calif.: V. E. Britton, *Div. Supt., Gas Dept.;* W. H. Cohick, *Supt., Gas Distribution Dept.;* J. C. Hitchcock, Richmond, Calif., *Supervising Foreman;* J. E. Mulgrew, *Supervising Foreman, Gas Dept.* Humboldt Div., Eureka, Calif.: Chris Knudsen, *Supt. Gas and Steam Prod.;* J. R. Vernon, *Gas Plant Foreman.* North Bay Div., San Rafael, Calif.: J. F. Sauer, *Div. Supt., Gas Dept.;* Carl B. Samuelson, Petaluma, Calif., *Gen. Foreman, Gas;* L. N. Pechette, Vallejo, Calif., *Dist. Gas Supt.* Sacramento Div., Sacramento, Calif.: W. F. Pape. *Div. Supt., Gas Dept.;* L. Mendonca, *Asst. Foreman, Gas Plant;* George McKay, *Foreman, Gas Distribution Dept.;* O. Skog, Woodland, Calif., *Dist. Foreman, Gas.* San Francisco Div., San Francisco, Calif.: W. A. Bahr, *Div. Supt., Gas Dept.;* E. G. Campbell, *Supt. Service, Gas Dept.;* Frank English, *Supt., Distribution Mains, Gas Dept.;* J. Doran, *Supt., Prod. Gas Dept.* San Joaquin Power Div., Fresno, Calif.: O. L. Dickinson, *Div. Supt., Gas Dept.;* L. R. Stubblefield, *Dist. Foreman, Gas;* W. F. Tyler, Bakersfield, Calif., *Dist. Foreman, Gas;* George Finney, Selma, Calif., *Dist. Foreman, Gas;* Scott Hughes, Merced, Calif., *Dist. Foreman, Gas;* E. M. Marshal, Madera, Calif., *Dist. Foreman, Gas.* San Jose Div., San Jose, Calif.: H. H. Hargraves, *Div. Supt., Gas Dept.;* W. H. McLean, *Dist. Supt., Gas Distribution;* A. M. Riesen, *Asst. Supt., Gas Distribution;* J. J. Breslin, San Mateo, Calif., *Dist. Supt., Gas Dept.;* K. Chamberlain, San Mateo, Calif., *Asst. Dist. Supt., Gas Dept.* Shasta Div., Red Bluff, Calif.: R. W. Miller, *Div. Supt.* Stockton Div., Stockton, Calif.: J. T. Leary, *Supt. of Gas Plant;* T. P. Jenkins, *Supt., Gas Distribution;* Job S. Rowe, *Gen. Foreman, Gas Distribution Dept.;* J. A. Riggs, Modesto, Calif., *Gen. Foreman, Gas.* Natural Gas Div., San Francisco, Calif.: O. O. Hannah, *Supervisor. Estimates and Records;* V. J. Thompson, *Ch. Clerk;* R. T. Peterson, *Ch. Gas Dispatcher;* L. F. Reetz, *Measurement Engr.;* F. E. Wilson, Hollister, Calif., *Supt., Gas Transmission Lines;* L. M. Glendening, San Martin, Calif., *Line Repair Foreman;* R. D. Dodge, Antelope, Calif., *Line Repair Foreman;* Leal Davis, *Foreman,* Kettleman Compressor Station; A. M. Toler, *Asst. Foreman,* Kettleman Compressor Station; William Johnson, *Head Field Operator,* Kettleman Compressor Station; A. L. Hill, *Field Mgr.,* Kettleman Compressor Station; Z. M. Young, *Line Repair Foreman,* Kettleman Compressor Station. 8,526 miles.

DESIGNERS AND BUILDERS OF PIPE LINES OIL PUMP STATIONS AND GAS COMPRESSOR STATIONS

MECCO

MID-WESTERN ENGINEERING AND CONSTRUCTION COMPANY

DREW BLDG. TULSA, OKLA.

Panhandle Eastern Pipe Line Co., 101 West Eleventh St., Kansas City, Mo.

J. T. Creveling, *Pres.;* G. J. Neuner, *V. P., Chg. of Operations;* Leith V. Watkins, *Sec.* and *Controller;* L. F. Sperry, *Treas.;* J. C. Reinbold, *Gen. Supt.;* C. H. M. Burnham, *Asst. to V. P., Chg. of Operations;* J. F. Curry, *Distribution* and *Industrial Sales;* S. A. Taylor, *Pur. Agt.;* H. W. Pope, *Supt., Land and Prod.;* G. T. Koch, *Supt. of Compressors;* F. C. Walters, *Supt., Gas Measurement;* D. K. Stephens, *Supt. of Transmission Lines;* J. S. Stevenson, *Ch. Engr.*

Panhandle Pipe Line Co., 301 Taylor St., Amarillo, Tex.

R. E. Wertz, *Pres.;* E. A. Sickels, Tulsa, Okla.; M. D. Snyder, and F. E. Jones. Kansas City, Mo., *V. P.s;* George Baird, New York, N. Y., *Sec.-Treas.;* E. C. Wagner, *Gen. Supt.;* R. L. Dever, *Supt.;* Frank Ford, *Foreman;* G. S. Pearce, *Meterman.* 33 miles, 3 to 8-in.

Peoples Gas & Fuel Corp., 901 Slattery Bldg., Shreveport, La.

Charles G. Laskey, *Pres.;* George Belchic, Clair B. Hughes, and Ronald M. Craigmyle, *V. P.s;* A. M. Pinney, *Sec.;* Ronald M. Craigmyle, *Treas.;* R. H. Curry, Haynesville, La., *Gen. Mgr.,* Louisiana Div.; G. S. Jones, Haynesville, La., *Div. Auditor;* Dave Walsworth, Haynesville, La., *Pipe Line Foreman.* 192 miles, 2 to 8-in.

Peoples Natural Gas Co., 545 William Penn Way, Pittsburgh, Pa.

J. French Robinson, *Pres.;* S. C. Preston, *V. P.;* J. B. Sayers, *Sec.;* S. J. Ratcliffe, *Treas.;* John J. Jacob, Jr., *Exec. Asst. to Pres.;* J. M. Chilcote, *Supt. of Operations;* L. E. Ostrye, *Supt., Distribution;* A. C. Perry, *Ch. Mechanical Engr.;* R. J. Plank, *Ch. Civil Engr.;* C. D. Altman, R.D. No. 1, Mayport, Pa.; C. R. Spencer, Apollo, Pa.; G. E. Walker, Waynesboro, Pa.; L. C. King, Murrysville, Pa.; M. R. McKinley, Monongahela, Pa., *Dist. Supts.;* H. W. Hoffman, Brave, Pa.; George R. Gibson, Imperial, Pa.; Glenn G. Gibson, Box 460, McKeesport, Pa.; B. P. Stewart, R.D. No. 6, Kittanning, Pa., *Dist. Engrs.,* Station Dept. 2,497 miles, transmission lines; 1,643 miles, distribution lines.

T. W. Phillips Oil & Gas Co., 205 North Main St., Butler, Pa.

T. W. Phillips, Jr., *Pres.;* B. D. Phillips, *V. P.* and *Treas.;* C. A. Wilder, *Sec.;* R. A. Beach, *Gen. Field Supt.;* E. J. Beach, *Supt., Compressor Stations;* John M. Philips, *Supt. of Distribution;* F. A. Baumgarten, *Supt., Oil Prod.;* G. D. Hutchinson, Punxsutawney, Pa.; F. R. Bates, New Kensington, Pa.; James I. Deamer, Tarentum, Pa.; J. S. Shaffer, Freeport, Pa.; W. P. Hindman, Kittanning, Pa., *Supts., Distribution;* C. A. Kemper, *Civil Engr.;* C. A. Hartung, *Pur. Agt.;* E. N. Cronenwett, *Cashier.* 2,000 miles, 2 to 12-in.

Pittsburgh & West Virginia Gas Co., 435 Sixth Ave., Pittsburgh, Pa.

F. R. Phillips, *Pres.;* P. H. McCance, *V. P.;* W. B. Carson, *Sec.;* F. F. Schauer, *V. P.* and *Gen. Mgr.;* Joseph McKinley, *V. P., Chg. of Sales;* H. D. Megahan, *Treas.;* Frank B. Saunders, *Controller;* D. P. Hartson, *Operating Mgr.;* H. H. Pigott, *Gen. Supt., Prod. and Transmission;* J. H. Newlon, *Supt., Prod.* and *Geologist;* Judson Bonsall, Union Bank Bldg., Clarksburg, W. Va., *Supt., Compressor Stations;* J. M. Shields, *Land Agent.* 1,401 miles, 1 to 20-in.

Public Service Co. of Oklahoma, 600 South Main, Tulsa, Okla.

R. K. Lane, *Pres.;* J. A. Whitlow, J. P. Arnold, and C. N. Robinson, *V. P.s;* R. F. Frank, *Sec.;* E. E. Ehret, *Treas.;* M. M. Schene, McAlester, Okla., *Dist. Mgr.;* C. J. Goodspeed, McAlester, Okla., *Supt. of Construction and Operation (Gas);* Jess Clanton, McAlester, Okla., *Foerman and Pipe Fitter (Gas);* James F. Dominic, McAlester, Okla., *Asst. Supt. (Gas).* 34 miles, 6 to 10-in. transmission lines; 74 miles, distribution lines.

Public Service Corp. of Texas, 902 Burk Burnett Bldg., Fort Worth, Tex.

William Horwitz, *Pres.;* Thomas Cook and S. B. Horwitz, *V. P.s;* I. E. Horwitz, *Sec.;* M. A. Berman, *Treas.;* H. J. Boisdorf, Perryton, Tex., *Supt.;* George Clennan, Perryton, Tex.; Ivan Conklin, Canadian, Tex.; O. W. Elliott, Mobeetie, Tex.; Cecil Henson Shattuck, Okla., *Branch Mgrs.* 231 miles, 4 to 6½-in.

R

Reidsburg Natural Gas Co., Clarion, Pa.

C. E. Deitz, *Pres.;* E. E. Deitz, *Sec.-Treas.* 2 miles, 2-in.

Republic Light, Heat & Power Co., Inc., 518 Jackson Bldg., Buffalo, N. Y.

S. B. Severson, *V. P.* and *Gen. Mgr.;* J. A. Ritchie, *Sec.-Treas.;* D. P. Spencer, *Asst. Sec.;* D. A. Hamilton, *Asst. Treas.;* J. F. Sweeny, Dunkirk, N. Y.; W. B. Kopfer, Batavia, N. Y., *Div. Supts.;* F. Fair, *Supt., Prod.;* G. M. Merrill, *Ch. Engr.;* W. H. Hott, *Measurement Engr.* 817 miles, up to 8-in.

Ridgway Natural Gas Co., 308 Seneca St., Oil City, Pa.

George E. Welker, *Pres.;* A. C. Burwell, *V. P., Chg. of Engineering;* J. G. Montgomery, Jr., *V. P., Chg. Prod.;* H. S. Rose, *Sec.-Treas.;* P. L. Mulkin, *Supt., Distribution;* M. J. Connor, *Pur. Agt.*

Rio Gas & Power Co., 812 Maverick Bldg., San Antonio, Tex.

Terry A. Hornaday, *Pres.;* Fred A. Hornaday, Jr., *V. P.;* A. A. Blondin, *Sec.;* Fred A. Hornaday, Jr., *Treas.;* Lloyd J. Johnson, *Supt.* and *Mgr.,* Eldorado, Tex., plant; Fred A. Hornaday, Jr., *Mgr.* Rio Grande City, Tex., plant. 18 miles, 1 to 4-in.

Rio Grande Valley Gas Co., Brownsville, Tex.

O. P. Wilson, *Pres.;* J. C. Jordan and R. B. Lloyd, *V. P.s;* James T. Jackson, *Sec.;* W. H. Meredith, *Asst. Treas.;* C. A. Irwin, *Pipe Line Supt.;* R. T. McMinn, *Auditor;* H. H. McIntire, *Pur. Agt.;* J. K. England, Harlingen, Tex.; R. W. Fenwick, Edinburg, Tex.; Mike Groom, McAllen, Tex.; J. T. Spettigue, Mercedes, Tex.; W. A. Young, Mission, Tex.; Guy Pierce, Raymondville, Tex.; D. W. Day, San Benito, Tex.; C. D. Bennett, Weslaco, Tex., *Local Mgrs.* 502 miles.

River Gas Co., 445 West Main St., Clarksburg, W. Va.

H. B. Schum, *Pres.;* J. C. Chisler, *V. P.* and *Treas.;* S. E. W. Burnside, *Sec.;* John W. Dow, 324 Fourth St., Marietta, Ohio, *Asst. City Plant Div. Mgr.;* J. W. Nolan, 324 Fourth St., Marietta, Ohio, *City Plant Foreman.* 257 miles, 2 to 12-in.

River Valley Gas Co., Paris, Ark.

40 miles.

Rocky Mountain Gas Co., Casper, Wyo.

H. H. Healy, *Pres.;* W. B. Emery, *V. P.;* J. A. Lee, *Sec.-Treas.;* W. M. Holland, *Gen. Mgr.;* G. F. Poe, *Gen. Supt.;* R. M. Miller, Lovell, Wyo.; H. O. Kapp, Rawlins, Wyo., *Supts.;* G. R. Smith, Cody, Wyo.; J. T. Fuller, Lovell, Wyo.; W. J. Nowlan, Powell, Wyo.; E. P. Murphy, Rawlins, Wyo.; W. W. Husted, Laramie, Wyo.; A. Anderson, Craig, Colo., *Local Agts.* 213 miles, 2 to 10-in.

S

St. Marys Natural Gas Co., 308 Seneca St., Oil City, Pa.

George E. Welker, *Pres.;* A. C. Burwell, *V. P., Chg. Engineering;* J. G. Montgomery, Jr., *V. P., Chg. Prod.;* H. S. Rose, *Sec.-Treas.;* P. L. Mulkin, *Supt., Distribution;* M. J. Connor, *Pur. Agt.*

Santa Maria Gas Co., 203 West Main St., Santa Maria, Calif.

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Sergeant Gas Co., Williamsport, Pa.

W. L. Heim, *Pres.;* John H. Bubb, *V. P.;* N. B. Bubb, Jr., *Sec.-Treas.;* W. L. Heim, *Gen. Supt.;* J. H. Heim, *Asst. Supt.;* George Schrade, *Foreman.* 18 miles, 3 to 8-in.

Smethport Natural Gas Co., 308 Seneca St., Oil City, Pa.

George E. Welker, *Pres.;* A. C. Burwell, *V. P. in Chg. Engineering;* J. G. Montgomery, Jr., *V. P. in Chg. Prod.;* H. S. Rose, *Sec.-Treas.;* P. L. Mulkin, *Supt. Distribution;* M. J. Connor. *Pur. Agt.*

Southern California Gas Co., 810 South Flower St., Los Angeles, Calif.

F. S. Wade, *Pres.;* William Moeller, Jr., *V. P.;* F. E. Seaver, *Sec.;* L. D. Romig, *Treas.;* H. P. George, *Gen. Supt. Natural Gas Prod. and Transmission;* B. M. Laulhere, *Technical Supervisor;* John Farmer, Avenal, Calif; A. B. Newby, Taft, Calif.; S. S. Donaldson, Newhall, Calif.; *Div. Mgrs.;* Grove Lawrence, Taft, Calif., *Transmission Supt.* 993 miles, 4 to 26-in. transmission lines. 8,000 miles, 2 to 16-in. distribution lines.

Southern Natural Gas Co., Watts Bldg., Birmingham, Ala.

C. P. Rather, *Pres.;* H. Gordon Calder, William R. Gignilliat, R. H. Ulrich and H. D. McHenry, *V. P.s;* William R. Gignilliat, *Sec.;* H. Gordon Calder, *Treas.;* H. E. Jackson, *Comptroller;* R. H. Burdick, *Ch. Engr.;* N. R. McKay, *Asst. Ch. Engr.;* J. B. Milmoe, *Industrial Sales Mgr.;* J. P. Neill, *Supt. Pipe Lines;* J. W. Yeldell, *Supt. Compressor Stations;* C. E. Terrill, *Supt. Measurements;* J. M. Starke, Jr., *Mgr. Land Dept.;* Robert G. Kenan, *Mgr. Insurance, Safety, etc.;* Langston McCalley, *Ch. Accountant;* J. E. Spelgel, *Traveling Auditor;* J. D. Kennedy, *Pur. Agt.;* M. B. Dolan, Yazoo City, Miss.; O. A. Tooley, Louisville, Miss.; R. E. Telle, Tuscaloosa, Ala.; W. M. Reinhardt, Wetumpka, Ala.; E. R. Shoffner, Birmingham, Ala.; A. J. Lanaux, Oxford, Ala.; T. B. Abney, Atlanta, Ga., *Dist Foremen;* R. H. Harris, Bastrop, La.; J. H. Johnson, Onward, Miss.; C. M. Bryan, Pickens, Miss.; O. W. Clark, Louisville, Miss.; V. E. Keolhofer, Reform, Ala.; H. P. Harris, Tarrant, Ala.; W. H. McBride, Perryville, Ala.; Q. D. Cockrell, Atlanta, Ga., *Compressor Station Ch. Engineers.* 1,322 miles, 2⅜ to 22-in.

Southern Union Gas Co. (and subsidiaries), Burt Bldg., Dallas, Tex.

A. S. Johnson, *Pres.;* F. W. Smith, Ross Byron, and C. H. Zachry, *V. P.s;* H. V. McConkey, *Sec.;* C. H. Zachry, *Treas.;* F. D. Bradley, *Pur. Agt.;* James C. Reid, *Gen. Supt.;* Van Thompson, *Supt., Measurement;* J. D. Reid, *Supt., Land, Lease, and Prod.;* Raymond Harrison, *Tax and Insurance;* Scott Hughes, *Legal Dept.* 1,433 miles, 2 to 12-in.

Southern Union Utilities Co., 1104 Burt Bldg., Dallas, Tex.

Albert S. Johnson, *Pres.;* C. H. Zachry, F. W. Smith and James C. Reid, *V. P.s;* H. V. McConkey, *Sec.;* C. H. Zachry, *Treas.;* James C. Reid, *Gen. Mgr.;* F. D. Bradley, *Pur. Agt.;* Van Thompson, *Measurement Dept.;* Scott Hughes, *Legal Dept.;* H. V. McConkey, *Accounting Dept.;* H. C. Frizzell, Bellville, Tex., *South Texas Dist. Mgr.;* Tom Corr, Pecos, Tex., *West Texas Dist. Mgr.;* A. C. Black, Kingfisher, Okla., *Oklahoma Dist. Mgr.;* Walter Koehn, Navasota, Tex.; J. A. Ruggies, Eagle Lake, Tex.; William Hintz, Columbus, Tex.; W. M. Harcum, Hico, Tex.; Gerald Webb, Monahans, Tex.; Jack Ott, McCamey, Tex.; Chris T. Brashear, Wink, Tex., *Town Plant Mgrs.* 276 miles, 2 to 6-in.

Southwest Natural Gas Co., 901 Slattery Bldg., Shreveport, La.

George Belchic, *Pres.;* Chas. G. Laskey, Clair B. Hughes and Ronald M. Craigmyle, *V. P.s;* A. M. Pineny, *Sec.;* Ronald M. Craigmyle, *Treas.;* H. F. Adlam, Lockhart, Tex., *Gen. Mgr. Tex. Div.;* C. E. Still, Stephenville, Tex., *Div. Supt.;* Whit M. Dubose, Lockhart, Tex., *Div. Auditor;* E. L. Coward, Yoakum, Tex., *Pipe Line Foreman;* C. A. Breitung, Ada, Okla., *Gen. Mgr. Okla. Div.;* W. O. Smith, Ada, Okla., *Div. Supt.;* R. C. Heard, Ada, Okla., *Div. Auditor;* Lindsey Davidson, Ada, Okla., *Pipe Line Foreman.* 300 miles, 1 to 16-in.

Southwestern Light & Power Co., Box 1470, Tulsa, Okla.

R. K. Lane, *Pres.;* S. I. McElhoes and Harry W. Pitzer, *V. P.s;* C. W. McIlhenny, *Sec.-Treas.;* William Schumacher, Box 458, Lawton, Okla., *Gas Engr.;* E. W. Shull, Box 458, Lawton, Okla., *Gas Supt.;* J. S. Boyett, Box 458, Lawton, Okla., *Div. Supt.* M. Douglas Parks, Chickasha, Okla., *Div. Supt.;* J. T. Thompson, Chickasha, Okla., *Gas Supt.;* A. P. Burns, Duncan, Okla.; *Mgr.;* H. W. Cotner, Altus, Okla., *Local Mgr.;* Wayne Jones, Box 458, Lawton, Okla., *Gas Meter Supt.;* G. I. Page, Box 458, Lawton, Okla., *Chg. of Operation and Construction.* 38 miles, 4 to 8-in. transmission lines. 204 miles, distribution lines.

State Fuel Supply Co., 1320 Petroleum Bldg., Oklahoma City, Okla.

F. S. Pratt, *Pres.;* M. T. Drisko, *V. P.;* Ray K. Osburn, *Sec.-Treas.;* Earl J. Newlin, *Asst. Sec.-Treas.;* Earl Fox, *Engr.;* T. R. Smith, Wewoka, Okla.; C. L. Boone, Anadarko, Okla., *Dist. Mgrs.;* F. D. Carpenter, Cement, Okla.; M. T. Riley, Rush Springs, Okla.; A. H. Cox, Carnegie, Okla.; G. A. Hutchinson, Lindsay, Okla.; B. W. Perkins, Laverne, Okla., *Local Mgrs.* 143 miles, 2 to 7-in.

State Line Gas Co., 306 Watson Bldg., Fairmont, W. Va. (subsidiary Monongahela West Penn Public Service Co.)

A. C. Spurr, *Pres.;* O. F. Lough, J. K. Buchanan and C. H. Leatham, *V. P.s;* G. J. Jackson, *Sec.;* O. F. Lough, *Treas.;* G. W. Harr, *Mgr. Gas Dept.;* H. C. Ice, *Geologist;* K. H. Bane, *Supt. Compressor Stations;* T. K. Heck, *Supt. of Meters;* J. W. Allison, Morgantown, W. Va., *Gen. Supt.;* R. G. Crawford, Morgantown, W. Va., *Field Supt.;* B. W. Cordray, Point Marion, Pa., *Local Representative.* 33 miles, 2 to 8-in.

Susquehanna Gas Co., Ninth and Hamilton Sts., Allentown, Pa.

J. S. Wise, Jr., *Pres.;* L. W. Heath, *V. P.;* C. M. Walter, *Sec.-Treas.* 82 miles, 3 to 14-in.

T

Texoma Natural Gas Co., 20 North Wacker Drive, Chicago, Ill.

W. A. Jones, *Pres.;* Floyd C. Brown, *V. P.;* S. E. Campbell, *Sec.* and *Asst. Treas.;* E. V. Kesinger, *Gen. Supt.;* G. M. Davidson, *Supt. of Operation* and *Ch. Engr.;* L. E. Biggs, *Pur. Agt.;* R. G. Strong, *Supt. of Pipe Lines;* W. T. Bulla, *Supt. of Telephone and Pressure;* J. G. Dickinson, Amarillo, Tex., *Supt. Prod.;* R. T. Powers, Fritch, Tex., *Supt. Station No. 1;* L. D. Williams, Fritch, *Tex., Div. Supt.* 325 miles, 4 to 24-in.

Triangle Co., P.O. Box 100, Pine Hollow Road, McKees Rocks, Pa.

J. B. Montgomery, *Pres.;* John H. Montgomery, *Sec.;* S. H. Morgan, *Treas.;* A. A. Bock, Crestview Drive, R. D. No. 1, McKees Rocks, Pa., *Engr.* 10 miles, 1 to 8-in.

Turner Gas & Oil Co., Box D, Bruin, Pa.

30 miles, 2-in.

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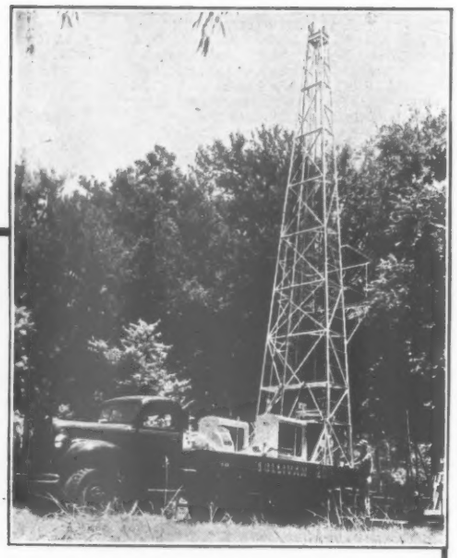

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U

Union Gas Co. of Canada, Chatham, Ont., Canada
S. A. Morse, *Pres.* and *Gen. Mgr.;* D. A. Coste, *First V. P.;* R. L. O'Brian and D. P. Rogers, *V. P.s;* T. Weir, *Comptroller* and *Sec.-Treas.* 1,704 miles, up to 16-in.

Union Gas System, Inc., Independence, Kans.
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United Carbon Co., Union Bldg., Charleston, W. Va.
Oscar Nelson, *Pres.;* G. A. Williams, T. F. Koblegard and T. S. Reed, *V. P.s;* C. H. McHenry, *Sec.;* T. A. Whelan, *Treas.;* Arthur Hanson, *Asst. Sec.;* C. A. Urban, *Asst. Treas.;* C. L. Staats, *Gen. Supt. Land Dept.;* I. G. Grettum, *Engr. Gas Dept.;* R. V. Sleeth, *Agent Land Dept.;* Darius Morris, Clendenin, W. Va., *Supt.* W. Va.; E. T. Tawney, Clendenin, W. Va., *Asst. Supt.* W. Va.; E. W. Fitzwater, Clendenin, W. Va., *Meterman* W. Va.; E. F. Hagans, Pikeville, Ky., *Supt,* Ky.; R. S. Bailey, Campbellsville, Ky., *Gen. Mgr.,* Taylor-Green Gas Co.; C. R. Payne, Pikeville, Ky., *Meterman,* Ky.; H. W. Engstrom, Monroe, La., *Gen. Supt.* La. and Kans.; H. E. Norrick, Monroe, La., *Supt.* La.; L. G. Clements, Monroe, La., *Asst. Supt.* La.; Clyde Burkholder, Monroe, La.; *Meterman,* La.; S. I. Bennett, Satanta, Kans., *Supt.* Kans.; W. F. Seeger, Borger, Tex., *Gen. Supt.* Tex.; S. O. Reeder, Tex., *Asst. Gen. Supt.* Tex.; C. K. Springfield, Sayre, Okla., *Gen. Supt.,* Okla.

United Gas Pipe Line Co., P.O. Box 1407, Shreveport, La.
N. C. McGowen, *Pres.;* R. H. Hargrove, *V. P.* and *Gen. Mgr.;* M. A. Abernathy, *V. P.;* S. L. Davis, *Comptroller;* J. H. Miracle, *Sec.;* A. L. McClellan, *Treas.;* R. E. Hull, *Auditor;* A. D. Greene, *Ch. Engr.;* E. R. Cunningham, *Gen. Supt., Main Pipe Lines;* Ed Parkes, *Gen. Supt., Field Pipe Lines;* A. L. Bradford, *Gen. Supt., Compressor Stations;* H. E. Randall, *Mgr., Industrial Sales;* W. N. Ford, *Mgr., Industrial Development;* W. F. Fulton, *Gen. Supt., Gasoline Plants;* H. F. Carr, Baton Rouge, La.; A. P. King, Beeville, Tex.; J. E. Bahan, Dallas, Tex.; W. H. Spears, Houston, Tex.; J. P. Rogers, Jackson, Miss.; J. G. Hicks, Monroe, La.; E. F. Humes, San Antonio, Tex.; F. E. Lacaze, Shreveport, La.; F. B. Winbery, Iowa, La., Southwest La. Dist.; Robert Wetzel, Wichita Falls, Tex., *Dist. Mgrs.* 5,814 miles, up to 24-in. (including 70 miles leased).

United Natural Gas Co., 308 Seneca St., Oil City, Pa.
George E. Welker, *Pres.;* A. C. Burwell, *V. P., Chg. Engineering;* J. G. Montgomery, Jr., *V. P., Chg. Prod.;* H. S. Rose, *Sec.-Treas.* P. L. Mulkin, *Supt., Distribution;* M. J. Connor, *Pur. Agt.*

Upham Gas Co., Mount Vernon, Ohio
R. M. Craigmyle, *Pres.;* J. A. Upham, *V. P.;* A. O. Dawson, *Sec.;* P. B. Snodgrass, *Asst. Sec.;* C. W. Rockhold, *Asst. Treas.* 91 miles.

W

Weleetka Pipe Line Co., Sand Springs, Okla.
J. C. Happenny, *Pres.;* D. V. Sullivan, Okemah, Okla., *V. P.* and *Supt.;* T. S. Matthews, *Sec.;* C. F. Colvin, *Treas.* 21 miles, up to 12-in.

West Texas Gas Co., P.O. Box 1121, Lubbock, Tex.
A. R. Jones, Kansas City, Mo., *Pres.;* P. C. Spencer, New York, N. Y., *V. P.;* M. D. Snyder, Amarillo, Tex., *V. P.* and *Gen. Mgr.;* R. F. Hinchey, *V. P.;* George Baird, New York, N. Y., *Sec.-Treas.;* E. C. Wagner, Box 151, Amarillo, Tex., *Gen. Supt., Pipe Lines;* E. A. Dudley, *Asst. Gen. Supt., Pipe Lines;* John S. Legate, Box 127, Fritch, Tex., *Supt., Gasoline Plant;* T. J. Sutherland, *Supt., Main Lines;* E. B. Mitchell, Plainview, Tex., *Supt., Compression Stations;* Z. A. Kimbro, *Supt., Telephone System.* 802 miles, up to 16-in.

Wheeler Gas Co., Wheeler, Tex.
H. M. Wiley, *Owner* and *Mgr.;* Max Wiley, *Asst. Mgr.* 40 miles.

Z

Zenith Gas System, Inc., Alva, Okla.
W. L. Woodward, *Pres.;* Lewis A. Robertson, *V. P.;* H. L. Hayden, *Sec.-Treas.;* W. L. Woodward, Alva, Okla.; William Flury, Avard, Okla.; E. L. Moore, Cherokee, Okla.; B. O. Young, Hardtner, Kans.; Clair Schnoebelen, Mooreland, Okla.; Forrest George, Quinlan, Okla.; D. R. Thomas, Waynoka, Okla.; Lewis A. Robertson, Woodward, Okla., *Mgrs.;* C. W. Mann, *Supt.* 193 miles, ¾ to 10-in.

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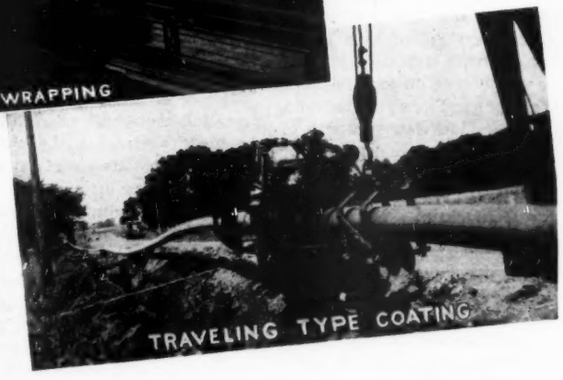

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Chemists Learn Details of Oil-Rubber Manufacture

(Continued from Page 57)

shown that the wear properties, of a highly refined white oil for example, can be improved 10 times by the addition of the chemical polishing agents alone. When both polishing and 'film holding' agents are used this factor has been increased to 17 times."

Solvents

A class of petroleum products which represents a substantial and increasing volume annually is solvents. This classification covers a broad field of industrial materials and at present assumes special importance as potential war materials. Included in this group of papers was one bearing the title, "Aromatic Petroleum Naphthas," prepared by Dr. W. J. Sweeney, of Esso Laboratories, and E. H. McArdle, of the Standard Oil Development Co. Included in the discussion were timely references to the availability of toluene and special attention was given that group of solvents used to such a large degree in modern paints and lacquers. They recited the experience of recovering appreciable quantities of naphthenic solvents from crude oils which had been classified as paraffinic. To quote the authors: "Contrary to general opinion, it was found that domestic straightrun naphthas of the highest aromatic content were obtained from certain paraffinic, rather than naphthenic, crudes. This discovery, coupled with the fact that the separation or concentration of aromatic hydrocarbons is more efficient where the aromatics are associated chiefly with paraffins, has rendered possible the production of a selective-solvent extract which contains 88 per cent of aromatic hydrocarbons.

"Highly aromatic petroleum solvent naphthas of this type with sufficient purity for the most exacting coating requirements can be economically manufactured from only a comparatively few domestic straightrun petroleum naphthas. When it is considered, however, that in 1937—a year of abnormally high coke-oven activity—only 20,000,000 gal. of toluene, 4,500,000 gal. of xylene, and 6,000,000 gal. of coal-tar solvent naphtha were produced in this country, and that during the same period 22,000,000,000 gal. of gasoline were produced, it is seen that petroleum provides a large reserve of aromatic hydrocarbons against future demands, or in time of national emergency."

Road Materials

Road oils and the several classes of cutback, emulsified and straight reduced asphalts shared in the program as subjects of timely interest. E. W. Klinger, A. Holmes and R. F. Phillips, all of Standard Development Co., emphasized the importance of this group of products by enumerating the miles of bituminous-surfaced state roads in use each year since 1924 and compared this figure with the total mileage of all improved roads. This relationship follows in an abbreviated form (all data are expressed in miles):

Year—	Total improved state roads	Bituminous improved state roads
1924	259,721	9,169
1930	321,723	27,422
1935	422,582	119,063
1940	477,033	196,424

From the above data, the unusually rapid rise in the use of bituminous materials as a means of improving roads becomes apparent when it is seen that in the 10-year period from 1930 to 1940 more mileage has been surfaced with bituminous materials than the combined length of all roads added to the system.

On the subject of asphalts alone, R. R. Thurston and Dr. E. C. Knowles of the Texas Co. offered several practical suggestions.

Synthetic Rubber

Climaxing 10 years of intensive petroleum research, "butyl rubber" became a commercial reality earlier this year. It is a 100 per cent petroleum product and differs materially from the other rubber substitutes synthesized from petroleum. This product was described by Dr. Frolich, as mentioned here previously, and in his remarks he said:

"Butyl rubber is a radical departure from the conventional approach to the problem of supplying the nation's need for synthetic rubber. Distinctive characteristics of the new synthetic include greater ability to stretch than natural rubber; remarkable stability and durability; freedom from impurity, taste and odor; lack of color; good age, tear and abrasion resistance; amazing resistance to mineral acids, and unusual electrical properties.

"The fundamental chemical difference between natural and butyl rubber is that the natural-rubber molecule is highly unsaturated, while the butyl-rubber molecule is unsaturated only just enough to allow it to be vulcanized, and no more. This control of unsaturation is the key to butyl rubber's distinctive properties.

"The degree of unsaturation of a chemical compound measures its ability to unite with certain other elements or compounds without elimination of any side product. The vulcanization of natural rubber is made possible by the chemical unsaturation of the rubber molecule which permits reaction with sulfur to take place in such a manner that the long molecular chains are tied or linked together into a firm structure.

"Rubber is so highly unsaturated that it remains unstable and chemically reactive even after it has been combined with the small amount of sulfur normally required in the vulcanization process. If we try to use enough sulfur to overcome this difficulty, we obtain hard rubber or ebonite—which obviously is not the answer for the production of elastic and pliable rubber goods.

"Chemists working on rubber have been inclined to associate the elasticity and other important physical properties of rubber with its chemical unsaturation. Chemists in the Esso Laboratories, however, in their studies of chain-like polymers with no residual unsaturation, recognized a majority of these important rubber-like properties. Polymers with no residual unsaturation may be made by uniting the simple olefins, or compounds, which are readily available as constituents of petroleum-refinery gases. But these olefins because of their saturated character resist all efforts to vulcanize them with sulfur.

"Through long years of research by a large group of men, the Esso Laboratories have now developed a method of copolymerizing olefins with small amounts of diolefins to give just the proper degree of unsaturation for vulcanization—but no more. Out of these efforts has come butyl rubber, which after vulcanization is a product with substantially no residual chemical unsaturation.

"Since, like natural rubber, it is a hydrocarbon, butyl rubber definitely does not belong in the class of synthetics that are resistant to swelling in petroleum solvents," Dr. Frolich added. "Somewhat paradoxically, however, it is more resistant to such simple aromatics as benzol and toluene than even the synthetic rubbers now employed in the construction of gasoline-dispensing hose. It is more resistant than natural rubber to many oxygenated compounds and to certain other solvents, such as ethylene dichloride.

"By some modification of the technique employed, butyl rubber may be processed and vulcanized in much the same manner as natural rubber. It may be compounded, either heavily or lightly, to obtain any type of stock, but in general it vulcanizes somewhat more slowly than natural rubber. It may be more highly loaded with carbon black and other pigments to give products of a given hardness, and this is an economic advantage.

"The tensile strength of butyl rubber is comparable to that of natural rubber in compounds which do not contain carbon black. As butyl rubber stretches much more than natural rubber for a given load, its strength per unit cross-sectional area at the point of break is actually much greater. Its tensile strength is not increased to the same extent as for natural rubber on the addition of large volumes of carbon black, but other properties such as tear resistance and abrasion resistance are affected in much the same way as in the case of natural rubber.

Can Be Readily Molded

"Butyl rubber is readily molded even into articles of intricate design, and its good tear resistance is an aid in removing such products from the hot mold. Its abrasion resistance may be made comparable to that of natural rubber, and it is also more resistant to continued flexing both hot and cold. Indeed, it will flex without cracking at a lower temperature than any other rubber, natural or synthetic. Although butyl rubber is more age resistant than natural rubber, it is advisable to add carbon black to prevent butyl rubber from becoming tacky on continued exposure to direct sunlight. Such carbon-black-compounded stocks are considerably more sunlight resistant than natural rubber. Further manifestations of butyl rubber's saturated character are its remarkable resistance to strong mineral acids and its unusual electrical properties. Hot concentrated nitric acid, for example, has no visible effect on the new product during a time interval which is sufficient to make a similar sample of natural rubber disappear completely. As an insulating material it is superior to all other types of rubber, and its electrical properties are not adversely affected on immersion in water.

"Butyl rubber is less permeable to both chemically active and inactive gases than natural rubber. Thus, it is many times as resistant to penetration of such gases as hydrogen and helium. It bounces much less than natural rubber at room temperature, but as the temperature is increased to 200° F. the rebound approaches that of natural rubber.

"In the light of the achievements to date," he concluded, "we are justified in looking forward to the development of a series of synthetics, each one of which will exceed natural rubber in certain specific properties, so that in the aggregate these products will give us something superior to rubber as we know it today. We believe that butyl rubber possesses properties which will secure an important place for it in this synthetic picture.

"Future manufacturing plans will be dependent somewhat upon tests now in progress and to be undertaken more widely when the material is distributed among prospective users. The program which is being followed with respect to the evaluation of the product for commercial uses is to some extent being governed by national-defense considerations."

●

Will Build Dock Facilities Along Ship Channel

Eastern States Petroleum Co., Inc., Houston, Tex., has let contract for the construction of dock facilities along the Houston Ship Channel. The dock will be located on the south side of the channel, just west of the Manchester dock about 1½ miles east of Harrisburg. The dock will be 150 ft. in length and 20 ft. wide, and will be connected with the shore by an 80-ft. runway.

California Marketers Still Uncertain and Confused

By L. P. STOCKMAN

THE past month has been one of uncertainty for California marketers due to the confusion arising from the presidential proclamation placing an embargo on exports of aviation gasoline outside the Western Hemisphere and the licensing of crude-oil shipments to foreign ports on and after July 31, 1940. It took 3 weeks to secure an understandable interpretation from the State Department with respect to the status of crude-oil shipments and in the meantime marketers were forced to store the refinable crude oil that would normally be exported to Japan. Preliminary data indicate that California marketers were obliged to store more than 1,000,000 bbl. of crude oil during August because the proclamation and subsequent orders could not be interpreted by counsel for any of the marketing companies involved. It later developed that there was no present intention of restricting exports of refinable crude as long as it was not sweetened with casinghead and other hydrocarbons which would permit the production of an aviation-base gasoline by straight distillation. Late in August Japanese tankers began arriving again in California to lift cargoes of crude oil, gasoline, and diesel and present indications are that most Japanese tankers will be back on the California-Japan run soon.

The piling up of crude oil during July and August as a result of decreased runs to stills and the suspension of Japanese shipments of crude oil clearly indicates the necessity of maintaining the Japanese market in order to maintain current production of crude oil. If this leverage is removed, operators must reduce crude-oil production by an amount equal to that normally exported to Japan. It is extremely unlikely that crude-oil production could be reduced another 60,000 or 70,000 bbl. per day without encountering rough going. The only encouraging feature in connection with existing conditions is the substantial gain in domestic demand and foreign requirements for fuel oil during the past few months. Gasoline consumption in Pacific Coast territory is up about 5 per cent above last year and it is quite probable that gasoline demand for 1940 will closely approximate that amount. An increase in gasoline consumption higher than the normal expected gain began 16 months ago and while sales of motor fuel for July 1940 appear to be slightly below the distribution during the preceding month, June, such is not the case. Imposition of an additional ½ cent per gallon federal tax on July 1 was responsible for an abnormally large amount of motor fuel being moved to distributing points during June to escape the additional tax.

Offshore Shipments

Offshore shipments from California to the East Coast for domestic consumption and in the foreign trade during the current year to date are substantially below liftings at the same time last year. A part of this reduction is due to almost virtual suspension of Japanese shipments during August last. There is no reason why future shipments to Japan of all commodities except aviation gasoline should not continue as no limitation has been imposed on motor gasoline, fuel oil, diesel, kerosene, automobile lubricating oil, and other products of this nature. Heavy crude oil is not subject to licensing and can be moved at will. Refined crude oil requires a license but the State Department has adopted a policy that, "Licenses are being issued freely for the export of all crude oils except those mixed with isobutane, isopentane, neohexane, or alkylates." A number of licenses have been issued to California marketers for the shipment of crude oil to Japan and to date none has been refused. These licenses are good for a period of 1 year but it is quite obvious that they are subject to cancellation without explanation.

Export shipments of crude oil, fuel oil, diesel, gasoline, kerosene, and lubricating oil during the first 8 months of 1940 are substantially below liftings during the same time last year. Gasoline shipments, which are down 2,552,224 bbl., show the largest reduction. Crude-oil exports are off 2,537,005 bbl. and kerosene shipments are down 554,513 bbl. from liftings at the same time last year. Intercoastal shipments to the Atlantic and Gulf Coast for domestic consumption are down 1,664,423 bbl. in the aggregate. Diesel and asphalt which showed small gains were the only commodities to register increases. All other products were lower this year. Fuel-oil shipments in the intercoastal trade are down 1,183,775 bbl. due primarily to reduced liftings by Shell Oil Co., Inc., which moved most of the total of 1,594,295 bbl. of fuel oil to the East Coast last year. The apparent shortage in furnace and heating oil along the Atlantic seaboard and Midwest may result in increased liftings of these commodities in the California market within the next few months. The California situation is such that a substantial amount of this demand can be furnished without disturbing the storage situation. California marketers have put about 2,000,000 bbl. of crude oil in stocks during the past 2 months but during the same time have reduced stocks of gasoline about 2,500,000 bbl. so that the increased amount of gasoline resulting from increased runs of crude oil to produce additional amounts of furnace and heating oil would not greatly affect gasoline stocks. This is especially true because of the good demand for fuel oil, refinery residuum. Fuel-oil stocks, incidentally, have been reduced 6,955,951 bbl. during the past year and at the close of July 1940 totaled 64,319,349 bbl. based on A.P.I. data from the Pacific Coast office.

Production and Curtailment

Crude-oil production in California has been holding steady for the past few months although compliance with curtailment has been unchanged. The conservation committee, faced with a probable smaller export movement due to interruption of Japanese shipments, has reduced the state's allowable for the month of September to 571,000 bbl. daily, a cut of 16,000 bbl. per day from the August allowable of 587,000 bbl. daily. This reduction in the light of recent developments is in line with what marketing executives believe will be the trend. The summer-vacation period generally comes to a close on the Pacific Coast soon after Labor Day when the schools open for the fall session. Pacific Coast areas do not show as much of a climatic change as other sections of the country but when the school season opens motoring is reduced and consequently gasoline consumption is cut down. This year, Admission Day falls on a Monday so that with this legal holiday in California motorists will have a 3-day vacation on two successive week ends. Admission Day, signalizing the entrance of California into the Union, usually marks the last day of summer although September weather many times is warmer than July and August.

When reducing the California allowable crude-oil production to 571,000 bbl. daily during September, the Conservation Committee was obliged to cut the top well production from 163 bbl. daily to 156 bbl. The committee has been working for the past several months to keep the top well allowable from being reduced below 150 bbl. daily by the end of 1940. With 3 months to go the top well allowable will be substantially below the objective if the present rate of reduction is carried out. If Japanese exports continue at a high rate it may be possible to keep the state's allowable around 571,000 bbl. and thus maintain the top well allowable around 150 bbl. per day by the end of the year. A total of 887 wells were affected by the reduction in the top well allowable for September and a conservative estimate places the number that will be affected during December at 950 wells. Actual crude-oil production in California has been averaging around 30,000 bbl. above the prescribed allowable and on this basis actual production during September will probably approximate 600,000 bbl. daily. A large part of this 30,000-bbl. excess is due to a difference of opinion regarding the allotment given to the Kettleman North Dome field. The Conservation Committee has given the field an allotment of 33,232 bbl. per day but operators have been producing about 46,500 bbl. daily. As long as this condition exists, and it has existed for several years, actual crude-oil production in California can never be reduced to the regularly prescribed allotment.

No Reductions in Exports

A check of tanker charters indicates that no apparent reduction in exports will take place during the next 60 days. Socony-Vacuum was recently granted permission to load two cargoes of motor gasoline on the tankers Vacuum and China Arrow, for movements to Vladivostok, Russia, consigned to Soyuznefteexport. The company also secured permission to load a cargo of fuel and diesel to be moved in the company's tanker Emidio, in September. The Kellogg Steamship Co. has been granted permission to use two of its American tankers, Gertrude Kellogg and Elizabeth Kellogg, to move cargoes of fuel oil from California to Manila in September and early October, and Standard Oil Co. has been granted permission to use its tanker, District of Columbia, to move a cargo of straightrun gasoline from San Francisco to Vladivostok for Soyuznefteexport, an agency of the U.S.S.R. Government. Standard Oil Co., with permission, has already moved several cargoes of motor gasoline this year to Russia in American tankers. This movement is permissible and may result in additional shipments of motor gasoline provided it does not reach belligerents. Whether there is a loophole in the recent proclamation banning export of petroleum from which airplane gasoline can be made has not been admitted but certain agencies are expressing abnormal curiosity about some heavy oils being shipped to Japan since the ban, according to shipping men at Los Angeles Harbor. No one has pointed a finger at anyone yet, and apparently never may do so, on the assumption that what is being done may be within the letter of the law. But it is known the curiosity continues while Japanese disappointment over the ban expressed a few weeks ago seems less pronounced. Active loading for Japan again is well under way after a temporary suspension.

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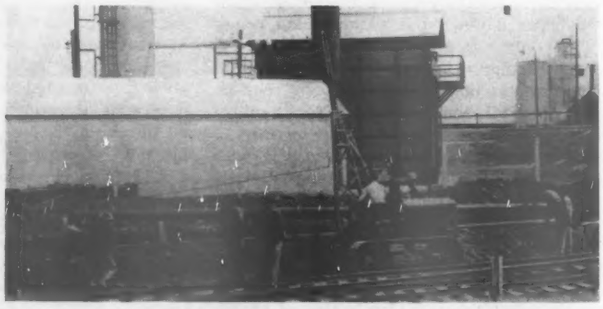
Model "140" DITCHER

Digs—16" to 30" wide 5'4" deep, at speeds from ½ foot to 26 feet per minute. Spoil-conveyor shiftable and reversible. Extra strong boom, wheel and buckets. Digs all types of soil successfully. Operates over roughest terrain. Special equipment for stripping pipelines.

Model "90" BACKFILLER-PIPE CRANE

A pipeline backfiller that's built to go anywhere. Affords faster clean-up on any size line. Instantly available for lowering slack-loops, pulling road-crossings, unloading or laying pipe.



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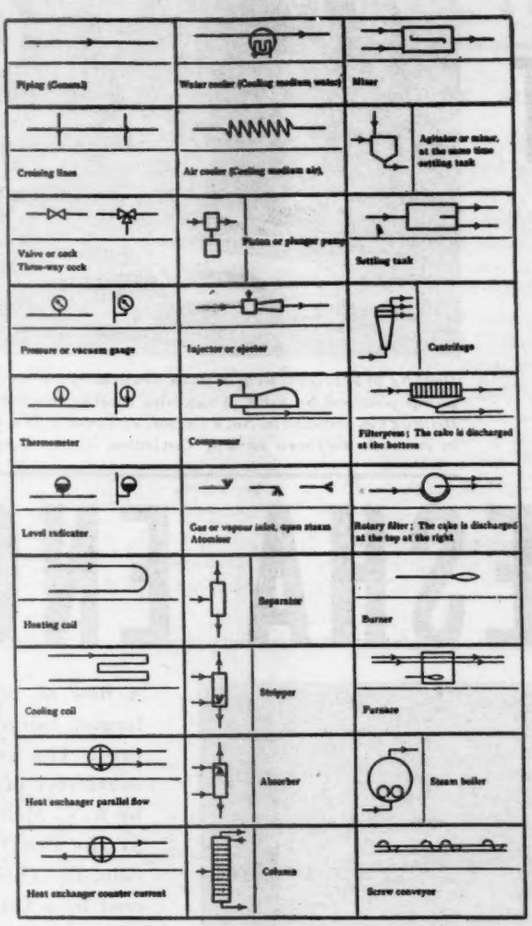
QUESTIONS ON TECHNOLOGY

By W. L. NELSON, TECHNICAL EDITOR

Standard Symbols for Flow Diagrams

The many different symbols that are used to designate plant equipments in flow diagrams is confusing to me. Is there some reference which shows what these symbols mean?—L. G. P.

No standard set of symbols has been adopted or even used regularly by large groups of the petroleum industry. Nevertheless, The Hague technical department of the Royal Dutch-Shell Co. and the International Standards Association have proposed the symbols that are shown on this page. The symbols have been published in "A Petroleum Handbook," second edition, published by the Shell company. Although some authorities may contest the use of some of these symbols, they are certainly a move in the right direction and the use of these or other standard symbols will assist greatly in making flow diagrams more intelligible.



Toluene From Crude Oil—Natural and Synthetic

What is the best crude that is available in Louisiana for producing large amounts of toluene?—W. C. N.

Refer to Technical Question answered on Page 88 of The Oil and Gas Journal of May 23, 1940, for the general situation regarding aromatic crude oils.

Naphthenic crude oils contain a relatively large amount of aromatic hydrocarbons. The amount, however, is actually rather small, and the percentage of toluene would seldom exceed 1 per cent. Another factor is the low gasoline content of many naphthenic crude oils. Thus, the Louisiana crude oils from Bellevue field, Bossier Parish, and Caddo field, Caddo Parish, are highly naphthenic, but they contain so little gasoline that they probably would not contain much benzene or toluene. The following crude oils in the Louisiana vicinity should contain relatively large amounts of toluene: Arkansas, Smackover; Louisiana, Olla, La Salle Parish; Elm Grove, Bossier Parish; and Cotton Valley, Webster Parish. These crude oils are suggested because they have low gravities and produce high octane-number gasoline, which properties indicate the general nature of the crude oil. Analyses for the amounts of aromatic hydrocarbons are not available on these crude oils and in fact not many such analyses have been made on any crude oils.

So many questions have lately arisen on the aromatic content of crude oils that the newly developed process of producing toluene, etc., from normal heptane should be brought to your attention. In April of this year, Grosse, Morrell, and Mattox report yields of 90 per cent of toluene from normal heptane by the use of such catalysts as chromium trioxide, molybdenum oxides or vanadium oxides supported on activated alumina. (Ind. Eng. Chem. 32, 528, 1940.) Such a chemical operation is referred to as cyclization—or the taking of straight-chain hydrocarbons and looping them into a ring type of structure such as toluene or benzene. A temperature of 550° C. (1,020° F.) is employed and a system is used which involves recycling of that part of the normal heptane that is not acted upon on the first pass through the system.

The general problem of cyclization of paraffin straight-chain compounds into aromatics is an important one because the supply of petroleum as a raw stock is almost unlimited, whereas, the amount of coal tar from which benzene and toluene has been obtained heretofore is strictly limited. Thus, from the standpoint of a war emergency, unlimited amounts of toluene as a stock for the manufacture of explosives, will be available to those countries which have petroleum. All petroleums contain heptane and in amounts that far exceed that of toluene. Doubtless other hydrocarbons as well as heptane, can be converted into aromatic hydrocarbons.

Effect of Hard Water on Livestock

Could you advise me about the proportions in grains per gallon of sulfates either as sodium, magnesium or calcium and the presence of chlorides either as sodium, calcium or magnesium, as found in creek water that are injurious to livestock?—W. R. N.

This has been a bothersome question for many years in both this country and over the world. Exact information is difficult to obtain due to the fact that tolerances can probably be established within a strain or family of animals by constant or increasing diets of water solids, whether the animals are old or young, whether they are in milk production, and because people have been quick to blame hard water for deaths, retarded growth, etc., without bothering to analyze the water or general conditions of the animals. Results by various experimenters are not altogether in agreement. Hardness in parts per million (p.p.m.) can be converted to grains per gallon by dividing by 17.1.

According to A. A. Rumsey, Agricultural Gazette, N.S., Wales, 1924, Page 339, horses will thrive on water containing up to 5,720 p.p.m. (334 grains per gallon) of sodium chloride or 7,660 p.p.m. of total solids. Cattle and sheep do equally well on 11,440 p.p.m. and 14,300 p.p.m., respectively. However, Ward Giltner and E. T. Hallman, Am. J. Vet. Med., 1914, Page 8, report that a water containing only 1,068 p.p.m. total solids proved deleterious to horses probably on account of the high sulfate content of 490 p.p.m. Two other bulletins are useful—Bull. 217 Oklahoma Agricultural Experiment Station, Stillwater, Okla., issued December 1933, entitled "The Effect of Saline and Alkaline Waters on Domestic Animals," by V. C. Heller, and Bull. 103, West Virginia University Agricultural Experiment Station, Morgantown, W. Va., "Occurrence of Barium in the Ohio Valley Brines and Its Relation to Stock Poisoning," by C. D. Howard. The upper limit set by V. G. Heller for total solids is higher than given by others, being 15,000 p.p.m. for cattle and 45,000 p.p.m. (salt 2.5 per cent and magnesium sulfate 2 per cent) for sheep.

Some animals are more resistant than others. The order of resistance appears to be somewhat as follows: Sheep, cattle, horses, and hogs. The total solid content appears to be the main factor—that the kind of solid material has little effect.

As an example of experiments that have been conducted, the following table from Bull. 217 by Heller, on growth of hogs, is presented below.

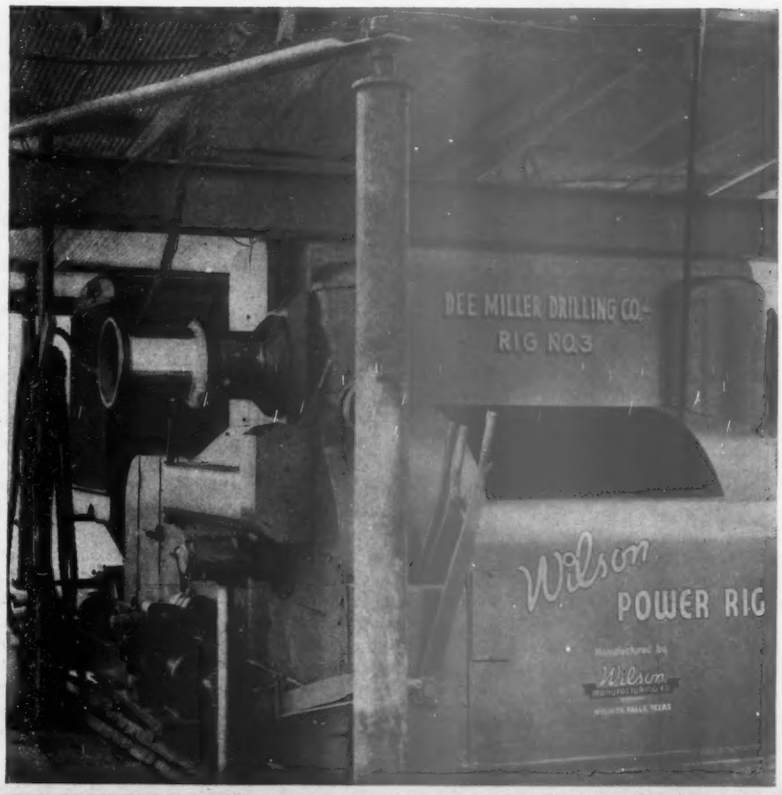
Hogs are more susceptible to salt injury than other domestic animals particularly during the winter months. The 1 per cent sodium chloride solution seems not to be particularly harmful after the animals have become accustomed to the taste. Even the 1.5 per cent salt group of animals returned to normal after being put back on city water and gained weight even faster during the following month than the normal lots of animals.

EFFECT OF VARIOUS CONCENTRATIONS OF SALT WATER UPON HOGS—SUMMER
(Average per hog per day)

	City water			1.0% NaCl			1.5% NaCl		
Date—	Average weight, lb.	Feed, lb.	Water, gal.	Average weight lb.	Feed, lb.	Water, gal.	Average weight, lb.	Feed, lb.	Water, gal.
8-28-33 ...	72	2.25	1.0	70	1.75	0.75	70	1.15	1.00
9- 1-33 ...	80	2.25	1.0	72	1.85	0.75	67	1.55	1.00
9- 5-33 ...	86	2.25	1.1	80	1.60	0.75	68	0.60	0.85
9-11-33 ...	92	2.75	1.5	80	2.50	0.75	67	0.65	1.00
9-18-33 ...	103	2.75	1.1	100	2.75	0.75	69	1.00	1.00
9-29-33 ...	116	3.00	1.5	108	3.00	1.50	71	1.00	1.90
Av. gain ..	44			38			1		

Drilling "LARGEST WELL" with WAUKESHA ENGINES

Drilling to 2913 feet, with **Wilson** *draw works powered by GAK* **Waukesha Engine,** *and pump powered by 6-EK* **Waukesha Engine,** *both butane-burning engines—Dee Miller Drilling Co. brought in No. 8 Carson well with a flow of 10,800 barrels in 24 hours. Located in extreme northern part of Centralia, Ill. field, well is owned by W. C. McBride, Inc.*



A flow of 10,800 barrels in 24 hours—the largest initial production in Illinois history! The well—Carson No. 8, three miles northwest of Centralia, Illinois—is owned by W. C. McBride, Inc., and was brought in by the Dee Miller Drilling Co., Lawrenceville, Ill. Their Wilson draw works is powered by a GAK Waukesha Engine and the pump by a 6-EK Waukesha Engine. Both engines burned butane.

Production was from the Devonian lime, between 2894 and 2913 feet. Other Devonian wells have shown larger rate-per-day production, but only in 3 to 12 hour tests. None, however, have flowed so much in a period of 24 hours.

Wherever big wells are brought in . . . all through the Illinois field, *and every field* . . . you'll find Waukesha Engines supplying the power—for drilling, pumping, and every oil field use.

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FIELD DEVELOPMENTS...

HIGHLIGHTS FROM THE WEEK'S NEWS—

NEBRASKA—A Falls City well that failed to find production in Viola lime flowed 55 bbl. of oil an hour after plugging back and acidizing Hunton lime. If that rate of flow holds up on completion test it will be the biggest producer in the field.

MICHIGAN—After many months of effort commercial production has been found in Huron County, in Michigan's Thumb.

TEXAS GULF COAST—Frio production opened on old Mount Houston prospect, Harris County, while a wildcat in Shepherd area, San Jacinto County, prepared to test Wilcox sand.

LOUISIANA GULF COAST—Wildcatting stimulated by discovery of prolific production in the Lake Salvador area, St. Charles Parish, and showing of wildcat in the Bayou Perot area, Jefferson Parish.

WEST TEXAS—Crane County's newest Ordovician oil-producing spot, about 3 miles southeast of the deep Tubb (Ordovician) field, was given its second producer during the week to advance that area as a possible important Ellenburger lime field.

NORTH TEXAS—Initial gages were reported on the new discovery in Clay County and plug was being drilled out of the new discovery in Montague County. Both wildcats indicated production about 10 days ago but have now definitely opened new fields.

WEST CENTRAL TEXAS—The Palo Pinto lime Nowles field, located on the Jones and Haskell County line, was given a new outpost location and a new south extension producer during the week. Possibility is seen for the area developing into a major Palo Pinto lime field.

KANSAS—The Wilkins pool in Ellsworth County was extended ¾ mile northwestward to within 1 mile of the town of Holyrood. The Lansing lime areas of the Hall and Gurney pools, Russell County, were connected.

OKLAHOMA—A townsite drilling campaign was started at Weleetka, Okfuskee County, after a well just west of the city limits flowed 575 bbl. of oil in 16 hours. The Hewitt field, Carter County, was extended southwestward, and a new productive spot west of the East Seminole field, Seminole County, was uncovered.

CALIFORNIA—The discovery wells of the deep Inglewood zone and of the Castaic field in the Newhall district have been completed.

LA-ARK-TEX—The Jena district in La Salle Parish has developed into the most active region in the tristate area as additional Wilcox production is developed south of Olla.

COMPLETIONS IN ALL FIELDS . . .

(Week Ended September 14, 1940)

	Oil	Gas	Dry	Total	1940 total comp. to date	1939 total comp. to date
N. Y., Pa., and W. Va.	116	8	4	128	4,379	2,551
Ohio	11	9	9	29	808	523
Indiana	9	0	3	12	312	203
Kentucky	6	2	11	19	333	494
Illinois	56	0	12	68	2,688	2,494
Michigan	6	3	15	24	828	1,025
Kansas	21	0	10	31	1,254	901
Oklahoma	19	3	12	34	1,270	1,282
Texas:						
North Central Texas	19	0	16	35	2,045	1,706
West Texas	23	0	2	25	1,330	1,278
Texas Panhandle	4	1	0	5	431	288
Eastern Texas	14	0	1	15	418	523
Gulf Coast Texas	18	1	7	26	905	960
Southwest Texas	21	2	14	37	1,559	1,788
Total Texas	99	4	40	143	6,688	6,541
North Louisiana	5	1	2	8	418	388
Gulf Coast Louisiana	18	1	5	24	743	476
Total Louisiana	23	2	7	32	1,161	864
Arkansas	3	0	1	4	133	187
Montana	5	3	1	9	154	120
Wyoming	7	1	2	10	117	99
Colorado	0	0	0	0	12	15
New Mexico	5	0	1	6	404	404
California	15	0	4	19	742	664
Miscellaneous	1	2	11	14	150	29
Total United States	402	37	143	582	21,433	18,367
Total previous week	431	53	117	601		
Week ended Sept. 16, 1939	400	55	123	578		

SUMMARY OF OUTSTANDING FIELDS . . .

(Week Ended September 14, 1940)

FIELD—	Active operations	Oil completions	Initial prod.	Total No. oil wells	Daily av. prod.
TEXAS					
K.M.A.	52	3	1,641	1,445	31,917
Wasson	46	7	7,730	932	22,864
Ector County	49	6	4,829	2,267	47,800
Hull-Silk	44	6	4,397	346	6,845
Jones County	11	0	0	634	6,248
East Texas	19	10	567	25,904	374,896
OKLAHOMA					
Oklahoma City	12	1	744	838	102,450
Cumberland	9	0	0	4	2,000
KANSAS					
Bornholdt	15	3	1,309	116	3,450
Stoltenberg-Wilkins	18	4	1,080	112	2,250
Burnett	5	1	105	121	6,000
Trapp	13	1	102	572	14,450
LA-ARK-TEX					
Olla, La.	9	1	240	31	3,370
Cotton Valley, La.	4	0	0	157	13,430
MICHIGAN					
Adams	18	0	0	1	1,731
ILLINOIS					
Salem	69	13	4,077	2,871	158,473
Centralia	10	0	0	715	25,400
Louden	32	5	652	950	72,101
Other basin fields	248	38	5,294	2,451	96,974
Old fields	....	....	.....	.....	11,180
NEW MEXICO					
Lea County	46	2	2,800	2,556	85,260
Eddy County	53	3	265	614	16,525
MISSISSIPPI					
Tinsley	12	1	618	77	24,635

By
L. P. STOCKMAN

Castaic and Inglewood Deep Sand Discoveries Completed

LOS ANGELES, Calif., Sept. 16.—Another new oil field has been discovered in California, the second in 2 successive weeks, and R. R. Bush Oil Co. definitely proved up the existence of a new deep zone in the Inglewood field. Both wells are at present off production for corrective work. In the case of the new field, the discovery well has been killed in an effort to reduce the extremely high gas-oil ratio by blanking off the top of the oil zone which contains a gas cap and at Inglewood the large quantity of heavy mud has necessitated a clean-out job. These discoveries during the current week are of considerable importance both as far as the new discovery and the finding of the deep zone are concerned. The new field was found in the Newhall district at the extreme western end of Los Angeles County and only a relatively short distance east of the Ventura County line.

The discovery well was R. E. Havenstrite 1 Lincoln, in 16-4-17 in the Castaic area. The well exceeded all expectations when turned loose. It came in under complete control, flowing 755 bbl. of clean 56.8-gravity oil and 9,500,000 cu. ft. of gas per day from 6,949 ft. Gas production began climbing soon after the well got under way and at one time the well flowed at the rate of 20,000,000 cu. ft. of gas. Since the well failed to show any high gas pressure during the course of work the large volume of gas was entirely unanticipated. In addition, the well proved a surprise because it is the first well in the Newhall district to show a large flow of gas. Heretofore practically all wells have shown a low gas-oil ratio and a very small volume of gas. This is particularly true of the Aliso Canyon and the Rancho San Francisco fields where Tide Water Associated Oil Co. and Barnsdall Oil Co. have completed several large oil wells with relatively low gas-oil ratios.

Leasing Activity

Completion of 1 Lincoln by R. E. Havenstrite in the Castaic district has confirmed previous discoveries in the Newhall area with the result that this section of the state is now the hottest area from a leasing standpoint. Several additional exploratory wells are scheduled to be drilled in the immediate future and this may lead to more as there are a number of reconnaissance parties working over an area extending from Piru in Ventura County to a number of miles west of Newhall in Los Angeles County. Several new leases have been taken both before and after completion of 1 Lincoln and in most cases the contracts call for the start of drilling operations within 90 days. A number of operators have refused to enter the district because they consider that the land owners are asking exorbitant cash bonuses. In several instances owners of wildcat acreage are asking a cash bonus practically equivalent to the price of the fee acreage and of course the royalty is likewise out of line. Some have stated that they will remain out of the area but will return later if workable leases can be secured. Standard Oil Co., Shell Oil Co., Inc., and Continental Oil Co. all took substantial leases in the Newhall area a year ago and accordingly were able to make advantageous deals. Tide Water Associated Oil Co. has proved acreage through discovery of the Aliso Canyon field which it controls entirely as has Barnsdall Oil Co. which discovered the Rancho San Francisco field and which likewise controls all of the productive acreage to date. Havenstrite's next location in the newly discovered Castaic field will be south of 1 Lincoln and farther down the flank in the hope that a more favorable gas-oil ratio may be secured. It is not believed that Havenstrite controls all of the potentially productive acreage and for this reason additional drilling on adjacent holdings by other operators is anticipated.

Deep-Zone Discovery

R. R. Bush Oil Co., a progressive independent operator, has proved beyond a shadow of a doubt that the deep zone discovered by that company in the Inglewood field this week is a horizon of considerable magnitude and will prove to be of considerable importance in future production of the Inglewood field. Bush's discovery well was 1 Sentous located in the closed end of a canyon on the south flank of the Inglewood structure and as close to the axis of the structure as the lease boundary and terrain would permit. No. 1 Sentous was brought in flowing 500 bbl. of 31.8-gravity oil and 1,500,000 cu. ft. of gas daily from 8,760 ft. At one time the well was flowing at the rate of 1,250 bbl. per day but then drilling mud began to appear and the flow decreased. It is generally expected that a thorough clean-out job will remedy the heading as the well is undoubtedly flowing under a handicap.

It remains to be seen whether this completion will lead to additional drilling around the edge of the Inglewood structure as the well's performance seems to indicate that the edge of the field is located in close proximity to its location. Immediately upon completion of 1 Sentous, Standard Oil Co. began offset drilling on the Los Angeles Investment lease. Standard's first offset is 3-1 L. A. I. about 500 ft. west and a little south of the discovery well. Rotary drilling equipment is being rigged up and present plans call for actual drilling within another few days as water and gas lines have already been laid. It is interesting to note that there are foundations of two abandoned wells within a radius of 500 ft. and both are closer to the axis of the structure than 1 Sentous. Neither was carried deep enough. Up in the northwest edge of the Inglewood field, Federal Oil Co. has resumed drilling operations on 1 Smith which the company drilled to 6,700 ft. a few months ago and then suspended when it failed to find a deeper productive horizon. Completion of 1 Sentous at 8,760 ft. has led to a resumption of drilling and 1 Smith will be carried down to a depth comparable with that of the deep-zone discovery well. Irrespective of the outcome of drilling operations around the edges of the Inglewood field it has now been definitely determined that deeper drilling will be rewarded with large flowing wells. It has been the opinion of those familiar with the Inglewood structure that one or more zones could be expected below present production and completion of 1 Sentous confirms this belief. It is also quite possible that there is an intermediate zone between the Bush zone and present upper zones.

New Deep Test

A new deep test has been started in the Long Beach field of Los Angeles County but this does not mean that any move is in prospect to exploit the deep zone found late in 1938. The new deep test which will be carried to 10,000 ft. or better is Union 19 Long Beach Community and it is being drilled because of lease requirements which prescribe that the company must adequately protect its community lease from drainage. The zone to which this well will be drilled is known as the De Soto zone. It was found in December 1938 when the discovery was completed flowing 300 bbl. of very clean 28.9-gravity oil per day at 10,157 ft. Top of the productive oil sand was cored at 9,761 ft. but the well failed to produce very much gas and was put on a compressor within a short time after completion. Later Dormax Oil Co. drilled a deep test in the immediate area and it too failed to show favorable sustained production due to lack of gas. Union 19 Long Beach Community, which was spudded in late this week, is located southwest of Dormax Oil Co.'s deep well. Although the De Soto oil sand has been known to exist since late in 1938 there has been no attempt to exploit this zone due to the high drilling costs involved and the relatively small production secured.

Crude-Oil Production

Despite a lower allowable, crude-oil production in California on September 5 reached a total of 652,914 bbl. per day, the highest daily average recorded during 1940. This new peak reflects a general increase in San Joaquin Valley fields incident to a readjustment in production methods and not to any breakdown in curtailment. It has been customary for a number of operators in San Joaquin Valley fields to produce their total monthly allotment as early in the month as possible and then suspend production activities during the remainder of the period. This has been found advantageous in many fields and in addition to making pipe-line deliveries easier also results in a reduction in operating costs. Crude-oil production for the first 14 days of September is slightly above production during the same time in August when the allotment was 16,000 bbl. per day higher. The margin above August is, however, being gradually reduced and when final production data are in for September it is quite likely that a reduction will be recorded. Actual crude-oil production for September is expected to be reduced to about 600,000 bbl. per day. A concerted attempt is being made to effect additional curtailment in several fields and it is thought that tangible progress will be recorded within the next 3 weeks. Current daily production of leading California fields for the past week follows:

	Barrels
Wilmington	83,650
Midway-Sunset	59,150
Kettleman North Dome	47,600
Long Beach	43,950
Ventura Avenue	33,925
Coalinga	32,250
Huntington Beach	25,750
Dominguez	23,250
Santa Maria Valley	15,350
Rosecrans	13,300

Huntington Beach

Signal Oil & Gas Co. completed its first two wells on the Bolsa Chica Land Co. lease in the Huntington Beach field and in doing so extended the productive limits a short distance. The Bolsa Chica lease which was acquired earlier this year comprises 840 acres but it is not likely that more than 200 to 400 acres will be found productive. The derricks used in the drilling of these two wells have been moved to the next locations which will be Nos. 14 and 15. Walter Greenfield is drilling superintendent for Signal Oil & Gas Co. and is in personal charge of work.

The property has been considered as being partially proved for production due to the proximity of producing wells of Standard Oil Co. along the property line. It is the present intention of Signal Oil & Gas Co. to develop the Bolsa Chica lease on the basis of one well to each 10 acres and thus if 300 acres are ultimately proved productive the company will drill a total of 30 wells. The cost of these wells will approximate $50,000 each so that if the maximum number of acres proves productive it will require an expenditure of well over a million dollars.

LOS ANGELES BASIN COMPLETIONS

Castaic Field

Havenstrite, R. E., 1 Lincoln 16-4n-17w
Flowed 755 bbl., 56.8-gravity, 9,500,000 cu. ft. gas, T.D. 6,949 ft., 8⅝-in. water string cemented 6,653 ft., 12/64-in. bean; completion has resulted in discovery of new oil field, Los Angeles County.

Dominguez Field

Union 78 Callender 29-3s-13w
Flowed 538 bbl., 30.4-gravity, 2.8 per cent cut, 669,000 cu. ft. gas, 7/64-in. bean, pressures 900/900 lb., T.D. 7,375 ft., 573 ft. of 5½-in. liner including perf. 6,831-7,373 ft., Los Angeles County.

Union 4 Austin 29-3s-13w
Flowed 590 bbl., 31.8-gravity, 390,000 cu. ft. gas., T.D. 7,530 ft., 26/64-in. bean, pressures 600/650 lb., 574 ft. of 5½-in. blank liner cemented 7,530 ft., gun perf. with 261 holes, ½-in. at 7,081-7,115 ft. and 7,475-7,509 ft., 7,479 ft. of 2½-in. tubing with packer at 6,908 ft., Los Angeles County.

Huntington Beach Field

Signal 14-A Bolsa 34-5s-11w
Flowed 850 bbl., 27.2-gravity, 10 per cent mud but cleaning up, 1,000,000 cu. ft. gas, T.D. 4,600 ft. 8⅝-in. water string cemented 3,812 ft., 816 ft. of 6⅝-in. liner including 790 ft. perf., 22/64-in. bean, pressures 500/800 lb., extends productive limits of Huntington Beach field, Orange County.

Signal 15-A Bolsa 34-5s-11w
Flowed 645 bbl., 27.1-gravity, clean, 750,000 cu. ft. gas, T.D. 4,589 ft., P.B. 4,406 ft., 8⅝-in. water string cemented 4,032 ft., cemented through perf. 994 ft. with 260 sacks cement, 400 ft. of 6⅝-in. liner including 370 ft. perforated landed at 4,405 ft., 40/64-in. bean, pressures 350/600 lb., extends productive limits of Huntington Beach field, Orange County.

Inglewood Field

Bush, R. R., 1 Sentous 17-2s-14w
Flowed 500 bbl., 31.8-gravity, 1,500,000 cu. ft. gas, 24/64-in. bean, pressures 250/750 lb., T.D. 8,760 ft., 7-in. water string cemented 8,325 ft., 461 ft. of 5½-in. liner including 440 ft. of 80-mesh perf. landed 8,759 ft., 8,732 ft. of 2½-in. tubing; this well proves up new deep zone in Inglewood field.

Potrero Field

Associated 3 Cypress 34-2s-14w
Flowed 600 bbl. daily rate, 47-gravity, 15 per cent cut, 3,500,000 cu. ft. gas, T.D. 5,755 ft., deepened from 4,650 ft. where originally completed, 24/64-in. bean, pressures 1,360/550 lb., 6⅝-in. casing cemented 5,706 ft., 76 ft. of 4½-in. liner perforated 5,698-5,755 ft., 5,523 ft. of 2½-in. tubing. Los Angeles County.

Rosecrans Field

Union 43 Rosecrans 18-3s-13w
Flowed 450 bbl., 34.6-gravity, 3.9 per cent cut, 450,000 cu. ft. gas, T.D. 6,466 ft., 379 ft. of 4-in. liner including 358 ft. perf., 28/64-in. bean, pressures 300/750 lb., producing from O'Dea zone. Los Angeles County.

Wilmington Field

San Willis 10 Pet. Man 32-4s-13w
Flowed 290 bbl., 16.7-gravity, 5 per cent cut, from Ranger zone, T.D. 3,722 ft., 32/64-in. bean, C.P. 210 lb., 8⅝-in. water string cemented 3,015 ft., 721 ft. of 7-in. liner landed 3,721 ft. and perf. at intervals, located in town-lot area, Los Angeles County.
Union Pacific R. R. 150 fee 3-5s-13w
Flowed 1,152 bbl. daily rate, 30.4-gravity, completed in upper and lower Terminal zones, potential production 3,445 bbl. daily, T.D. 3,843 ft., 11¾-in. water string cemented 2,595 ft., oil string was 8⅝-in. including 278 ft. of 6⅝-in. landed 3,833 ft., perf. 3,080-3,181 ft., 3,211-3,307 ft., 3,322-78 ft., 3,389-3,445 ft., 3,600-3,708 ft., 3723-61 ft., 3,781-3,833 ft., cemented through perf. 3,078 ft. with 187 sacks cement, 3,598 ft. with 63 sacks, 2½-in. tubing with packer at 3,466 ft., Los Angeles County.

LOS ANGELES BASIN DRILLING REPORT

Dominguez-Gardena District

Nevada Drlg. Co. 1 Nevada 31-3s-13w
T.D. 3,600 ft., upper zone consisted of all gray water sand, have temporarily suspended operations to check future possibilities.
Wood-Mellon 1 Wood 31-3s-13w
T.D. 7,795 ft., P.B. 2,400 ft., redrilled to 4,252 ft. and set whipstock to direct hole up-dip, now redrilling at 4,070 ft., upper zone now definitely proven barren, Los Angeles County.

Inglewood District

Federal 1 Smith 7-2s-14w
T.D. 6,700 ft., in extreme northwest part of Inglewood structure, has been standing idle for several months following failure to find deeper zone, cleaning out preparatory to resuming work, Los Angeles County.
Standard 3-1 L. A. I. 17-2s-14w
Rigging up rotary drilling equipment, SE offset to 1 Sentous of R.R. Bush Oil Co., Los Angeles County.

La Habra District

Security L. & W. 1 Security 9-3s-10w
Drilling 4,860 ft. in Repetto sand and shale, last core showed siltstone formation, top Repetto (lower Pliocene) 3,710 ft., no showings, Orange County.

Newhall District

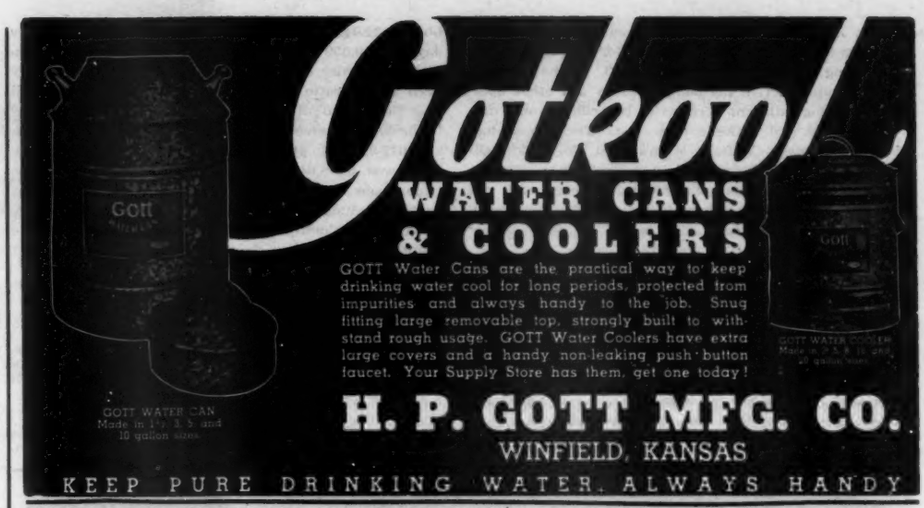
Newhall-Potrero 1 Ferguson 26-4n-17w
Drilling 7,950 ft. in brown shale with streaks of hard gray sand showing 45° dips, well is being drilled under contract by J. E. Mabee Drilling Co. and calls for a depth of 8,000 ft., core 7,654-59 ft. was gray sand, still above top Miocene and more than 2,200 ft. lower structurally than wells of Barnsdall in Newhall-Potrero field, Los Angeles County.

Pico District

Cal-Pico 1 Pico 7-2s-11w
Drilling 6,510 ft. in conglomerate, core 4,864-78 ft. showed gray water sand, several minor showings since passing 2,500 ft. but has not yet cored a solid oil sand, outlook problematical, Los Angeles County.

SAN JOAQUIN VALLEY

Some concern is being expressed over the failure of Honolulu 25-P fee to develop commercial production on the Buena Vista Hills anticline in the Midway-Sunset field of Kern County as the bit in this well is rotating ahead below 7,760 ft. The present formation is a brown shale with some fine tight gray sand and the ditch shows gas but no oil showings of importance have been recorded. It is believed that this well which is located on fee-owned acreage has drilled through the Stevens sand and if this is the case the well will have to go down to the Rio Bravo and Vedder zones before being considered a conclusive test. This means that the well will have to be drilled to a point between 10,000 and 11,000 ft. The failure of this well to show production higher up in the hole is a distinct disappointment as those interested in the area had expected production either in the Stevens or higher. Operators have felt so certain that production would be developed on the Buena Vista Hills anticline that they formulated a unit plan of development a few years ago. As other fields become developed and few new fields are being discovered, operators are once again returning to existing fields where they have undrilled acreage or potential deep zones that are still untested.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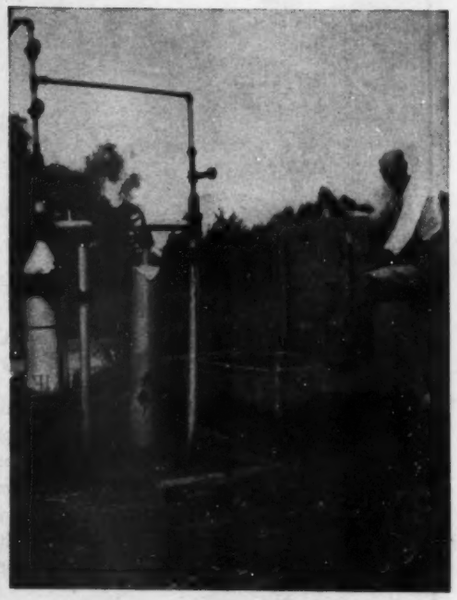
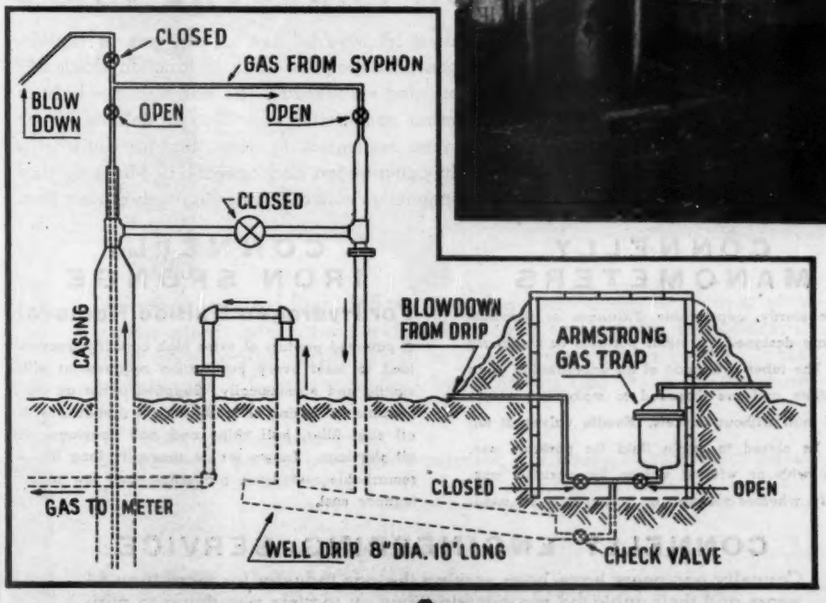
THE accompanying photograph and diagram shows the hook-up used by the Kentucky Natural Gas Co. for draining gas well drips. Formerly, the practice was to take gas from the casing head—water being removed by blowing down the syphon manually once a day. Now, they take gas from the syphon. Water carried over is knocked out by the simple separator. Operation is made completely automatic throughout the year by using an Armstrong Gas Trap to drain the separator. Records indicate that the wells now produce at a higher rate and have a materially longer life. For further information, write ARMSTRONG MACHINE WORKS, 868 Maple St., Three Rivers, Michigan.





ARMSTRONG STEAM TRAPS

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North American Oil Co. is at present considering the drilling of a deep test to the Temblor and accordingly is rigging up well No. 62 in 26-32-23. If the Temblor proves unproductive the company may ask other operators having adjacent acreage to contribute some dry-hole money and make a deep test. These operators include Chanslor-Canfield Midway Oil Co. Union Oil Co., Republic Petroleum Co. and several others. Republic Petroleum Co. has spudded in its second well out on the Midway front where it discovered a new accumulation of heavy crude oil at a shallow depth a few months ago.

Cole's Levee—Tupman

Richfield Oil Corp. is still running 15 strings of tools in the Cole's Levee and Tupman fields of Kern County and the present rate of work is expected to be maintained for another several months or at least until the company's objective of 100 new wells has been achieved. Early this week the company completed 54-32-A Kern County Land in 32-30-25 flowing 1,560 bbl. of 32.9-gravity oil and 7,000,000 cu. ft. of gas per day from 9,050 ft. but killed the flow soon after completion in order to take steps to reduce the excessively high gas-oil ratio. The high gas-oil ratio of this well may be due to the fact that the liner froze at 9,012 ft. or 38 ft. above bottom. This left the perforations at 8,647-9,012 ft. and the cement job through perforations was at 8,643 ft. Another cement job will be undertaken in an effort to correct the gas-oil ratio as well as reducing the volume of gas. The company's 34-3-C Kern County Land in 3-31-25 is getting quite deep at 9,613 ft. but shows some promise and might be an early completion.

SAN JOAQUIN VALLEY COMPLETIONS

Mountain View Field

Columbia 20 Crawford 19-30s-29e
T.D. 5,915 ft., P.B. 5,685 ft., top Santa Margarita 5,670 ft., bottomed in shale carrying streaks of oil sand, no evidence of faulting.

Northeast Coalinga Field

Amerada 1-17-B Southern Pacific 17-19s-16e
Flowed 1,680 bbl. daily rate, 27.6-gravity, 924,000 cu. ft. gas, 30/64-in. bean, pressures with 12/64-in. bean were 1,190-1,200 lb., T.D. 8,308 ft., cemented 5½-in. casing 8,296 ft. and cleaned out to 8,240 ft., gun perf. with 4 shots at 8,170-74 ft., top Kreyenhagen 7,180 ft., top glauconitic 8,123 ft., and top Gatchell 8,173 ft., Kern County.

Rio Bravo Field

Superior 3 Rudnick 28-28s-25e
Flowed 1,503 bbl. daily rate, 39.2-gravity, 2,450,000 cu. ft. gas, 32/64-in. bean, pressures 1,700/2,000 lb., T.D. 11,395 ft., 297 ft. of 5¾-in. drillable liner with perf. at 11,118-11,355 ft. landed on bottom, 10,517 ft. of 2½-in. tubing, top productive Rio Bravo zone 11,117 ft., elev. 338 ft., Kern County.

Tupman Field

Richfield 61-33-A Kern County Land 33-30s-25e
Flowed 1,180 bbl. daily rate, 32.1-gravity, 14 per cent, 1,200,000 cu. ft. gas, T.D. 9,310 ft., two 1½-in. beans, pressures 200/250 lb., 8⅝-in. water string cemented 8,840 ft., 507 ft. of 6⅝-in. liner including perforations 8,960-9,199 ft. and 9,240-9,305 ft. landed 9,305 ft., drilled by Bell & Loffland, elev. 314 ft., Kern County.

Richfield 18-29-A Kern County Land 29-30s-25e
Flowed 1,528 bbl., 33.7-gravity, 7 per cent cut, 1,780,000 cu. ft. gas, two 1½-in. beans, pressures 350/800 lb., T.D. 8,980 ft., 523 ft. of 6⅝-in. liner including perf. 8,589-8,649 ft., 8,689-8,789 ft., 8,809-8,975 ft., 8,953 ft. of 2½-in. tubing, Kern County.

SAN JOAQUIN VALLEY DRILLING REPORT

Cantua District

Texas 1 Everding 24-17s-15e
Drilling 7,198 ft. in Temblor sand and shale, top upper Variegated 6,215 ft., running 135 ft. lower structurally than 1 Southern Pacific in 23-17s-15e which Texas drilled to 10,116 ft. and plugged back to 9,356 ft., 1 Southern Pacific showed potential of 15 bbl. daily, cutting 95 per cent water, productive interval is Domengine sand of Eocene age, Fresno County.

Northeast Coalinga District

Associated 1 W. S. I. 6-19s-16e
Drilling 8,160 ft. in Kreyenhagen brown shale, top Kreyenhagen 7,596 ft., objective is Eocene sands. Kreyenhagen thicker than expected, Fresno County.

Kreyenhagen District

Continental 1 Kreyenhagen 4-22s-16e
Drilling 9,270 ft. in Kreyenhagen hard brown shale, top Kreyenhagen 8,333 ft., expected top of Eocene at 9,150 ft. but Kreyenhagen interval thicker than expected, at top of Kreyenhagen well was 1,500 ft. lower structurally than 1 Mantes of Superior Oil Co. drilled and abandoned in 6-22s-16e, Fresno County.

Panoche Creek District

Jergins Trust 1 Cheney 29-14s-13e
Drilling 9,225 ft., P.B. and redrilled to 7,350 ft., suspended account failure of zone to produce, base Etchegoin (Pliocene) 3,122 ft., top Kreyenhagen (Oligocene) 3,520 ft., top Domengine (Eocene) 4,460 ft., base Domengine 4,820 ft., and top Moreno (Mesozoic) 6,118 ft., Fresno County.

Blackwell's Corners District

Seaboard 66-17 Beer 17-26s-19e
Drilling 6,770 ft. in hard brown shale, top present shale body 6,705 ft., formation below Point of Rocks sand of Eocene age, cored 17 ft. of tight sand showing light cuts at 6,300 ft., no permeable sands, core at 6,400 ft. was gray Point of Rocks sand, Kern County.

Buena Vista Hills District

Honolulu 25-P fee 10-32s-24e
Drilling 7,590 ft. in brown shale containing streaks fine tight gray sand, good gas showing on ditch, top Bentonite 6,565 ft., top of Stevens believed found at 6,870 ft., Kern County.

Rio Vista Field

Standard 1 State 31-4n-3e
Completed as gas well but no gage made, T.D. 4,650 ft., top Emigh gas zone 4,448 ft., 6⅝-in. water string cemented with 600 sacks cement 4,280 ft., 410 ft. of 4¾-in. liner including 366 ft. of 60-mesh perf. landed 4,645 ft., 4,627 ft. of 1½-in. tubing, shut in, Sacramento County.

Rumsey Hills District

Standard 1 Typetts 9-12n-3w
Location, several wildcats have been drilled on this structure in past years and all showed gas, this structure formerly known as Nigger Heaven Dome, Yolo County.

COASTAL DISTRICT

Lloyd Corp. which is developing acreage in the extreme eastern end of the Ventura Avenue field found salt water on a formation test in 6 Lloyd at 7,096 ft. and the hole will accordingly be deepened. No. 5 Lloyd on the other hand showed some promise at 9,840 ft. but is not completed. This well blew out several weeks ago and resulted in a fishing job that delayed drilling operations and necessitated a redrilling job. Continental Oil Co. 18 Grubb in the San Miguelito field of Ventura County is standing cemented on top of the pay at 5,630 ft. In the Rincon field Chanslor-Canfield Midway Oil Co. cemented a blank string of 8⅝-in. casing in 37-B Hobson at 4,799 ft. and then gun perforated an interval with four holes at 4,231 ft. A test showed this interval to be dry and the company then gun perforated at 4,415-4,580 ft. Ten holes were then shot at 1,491-1,486 ft. and a squeeze job completed. A production test will be made within the next few days. In the meantime, 36-B Hobson is drilling ahead at 3,398 ft.

COASTAL DISTRICT COMPLETIONS

Lompoc District

Associated 1 Souza 12-6n-33w

(Continued on Page 205)

Always ON GUARD

Against Dangerous BACK FLOW

Connelly SUPER-SENSITIVE BACK PRESSURE VALVE

WHEREVER a positive check is required for reverse flow of air, gas or liquids, this Connelly Back Pressure Valve can be depended upon to function efficiently with no need of other expensive and complicated safeguards. The valve disc is light in weight and correctly balanced for extreme sensitivity, providing a definite check against back pressure, yet exerting minimum resistance to flow. Sturdily built in a wide range of sizes—unusually simple in construction and operation. Made so flap may be easily removed for cleaning and inspection without removing valve from line.

CONNELLY MANOMETERS

These sturdy, dependable U-Gauges or Manometers are designed for either portable or stationary use. The tubes are made of an unbreakable glass substitute and are threaded to make a pressure proof joint without gaskets. Needle valves at top may be closed to retain fluid for portable use. Made with or without valves for portable use. Specify whether mercury or water is to be used.

CONNELLY IRON SPONGE

For Hydrogen Sulfide Removal

A patented product of extra high capacity guaranteed to meet every purification requirement efficiently and economically. Supplied either as concentrate for mixing or ready for use prepared with all chip filler, half chips and half shavings, or all shavings. Known for its unusually long life—remarkable revivifying properties—and low maintenance cost.

CONNELLY ENGINEERING SERVICE

Connelly engineers have been serving the gas industry for more than 64 years and their unbiased recommendations on matters pertaining to purification, pressure control and distribution have been responsible for remarkable savings in many well-known plants. Send samples of your materials with details of your problems. We will gladly make an analysis and submit our findings without cost or obligation.

Write for Bulletins

CONNELLY IRON SPONGE & GOVERNOR CO.
CHICAGO, ILL.—ELIZABETH, N. J.

APPALACHIAN FIELDS

Few Developments in Eastern Area in Quiet Week

By STAFF CORRESPONDENT

PITTSBURGH, Pa., Sept. 16.—Except for one extremely large shallow gas well in Southeast Ohio, the lower eastern fields were dull and work of routine nature. Completions totaled 19, of which five were dry, eight gas wells, and six oil producers with a daily initial of 25 bbl.

SOUTHEAST OHIO

In Athens County, Southeast Ohio, Leonard Wallace completed a freak test on the A. P. Linscott farm, 1 mile northwest of Canaanville, Section 16, Canaan Township, as a gas well gaging 37,000,000 cu. ft. gas a day from the second Cow Run sand at 525 ft. Blowing open for a day and while 10-in. casing was being snubbed into the hole, the volume has not decreased.

Jefferson County

Cross Creek: O'Day Oil Co. 13 Mrs. W. P. McConnell, SW Sec. 3, dry, Berea, 1,340 ft.

Licking County

Newton Township: Guy T. Shrider et al 4 Ed. McKinney, Sec. 25, 3 bbl., Berea, 515 ft.

Monroe County

Bethel Township: Otto Spengler et al 25 Henry C. Swartz, Sec. 10, 2-bbl. pumper, first Cow Run, 579 ft.

Noble County

Jackson Township: W. H. Phillips & Co. 3 L. C. Wilson, SE Sec. 2, 2-bbl. pumper, Macksburg 500-ft. sand, 540 ft.

Perry County

Monroe Township: C. Z. Ruth 21 N. L. & C. M. Rodgers, NW Sec. 27, dry, Berea, 1,191 ft.

SOUTHWEST PENNSYLVANIA

On Chestnut Ridge in South Union Township, Fayette County, Pennsylvania, New Penn Development Co., William E. Snee et al bottomed 2 Summit Hotel (Heyn) at 6,982 ft. or 148 ft. below the top of the Oriskany sand. The Helderberg had not been reached but the formation was not indicative of added gas. The well is now being tubed. The volume is in excess of 2,000,000 cu. ft. a day.

Here, the Peoples Natural Gas Co. reached within few feet of bottom, 5,831 ft., in 2 Piedmont Coal Co. but failed to recover the lost bailer. The hole is now being cemented back to 5,640 ft. This company's No. 3 reached 1,367 ft. and will be cased at that point after an obstruction at 160 ft. is reamed out. In North Union Township, Wasson & Co. et al are drilling at 3,989 ft. in 2 J. H. Sorg. On Laurel Ridge, in Stewart Township, Fayette County, New Penn Development Co., William E. Snee and E. G. Mueller are shut down at 8,002 ft. in the test on the Gregg L. Neel farm.

Clarion County

Piney Township: Frank Shreffler 6 Clarion County Home, 40,000 cu. ft. gas, Hundred Foot sand, T.D. 1,235 ft.

Greene County

Monongahela Township: John Ingrahm et al 1 Bliss Donham, dry, Bayard sand 2,704-40 ft., T.D. 2,900 ft. May be plugged back to Gantz for test.

DRILLING REPORT

Allegheny County

South Fayette Township: Homer Nixon 1 James Parkes, 910 ft.
West Deer Township: Sipe Bros. 1 Sterling heirs, 1,700 ft.

Armstrong County

Cowanshannock Township: Peoples 1 Michael Miketa, 650 ft.
Equitable 1 Earhart heirs, 2,931 ft.
Huber 1 C. R. Huber, 2,525 ft.
Kiskiminitas Township: Chestnut Ridge 2 E. J. Shirey, building rig.
Kittanning Township: Local Company 1 G. A. Scholl, 510 ft.
Equitable 1 James Schuster, location.
Mahoning Township: John Wray et al 2 King Shaffer, 975 ft.
Parks Township: T. W. Phillips 1 France Klingensmith, 2,875 ft.
Plum Creek Township: William McCollins et al 2 Add Reefer, 1,735 ft.
Shelocta Gas Co. 1 Amos Boyer, 720 ft.
South Bend Township: Equitable 1 Margaret Claypool, spudding.
Valley Township: Local Company 2 W. L. Piert, 1,320 ft.
Wayne Township: Humphries, Stone & McCall 1 James Bittinger, 680 ft.
Penn Wayne Gas Co. 2 Ed. Clever, rigging up.
Samuel Sowers 1 William Rupp, 2,034 ft.
Watson et al 2 W. D. McIntire, 1,181 ft.

Clarion County

Limestone Township: George Hall 1 C. Fairman, 400 ft.
Peoples 2 Mrs. M. G. Brocius, 400 ft.
Monroe Township: Owens Illinois Glass 1 J. C. Heinrick, 800 ft.
Piney Township: Frank Shreffler 7 Clarion County Home, location.
Porter Township: T. W. Phillips 1 Brown School, 1,940 ft.
Climax Brick 1 Samuel McMaster, 480 ft.
Red Bank Township: John Lasher et al 1 Cora M. Truitt, 2,280 ft., fishing.
T. W. Phillips 1 Nathan Wolfgang, 1,112 ft.
O. H. Culbertson 2 Ed. Bowersox, 737 ft.

Fayette County

German Township: J. H. Carnell 1 Marion Gurzankuski, 2,031 ft.
Greensboro Gas 1 C. L. Springer, 2,570 ft., S.D., testing Fifty Foot gas.
Nicholson Township: Duquesne 1 Ivan Mallery, 1,660 ft., Big Injun 1,258-1,500 ft., show gas 1,397 ft.

Greene County

Aleppo Township: Peoples 1 S. N. Rinehart, location.
Center Township: J. B. Orndoff 3 Mattie I. Scott, 1,980 ft.
Jackson Township: Equitable 479 H. H. Smith, 1,575 ft.
Monongahela Township: Harry Scott et al 1 Silas Provins, building rig.
Wahler Powers Oil & Gas Co. 1 Katchanovitch, rigging up.
Morris Township: Romney Rutan et al 1 Alfred Rutan, 2,463 ft.
Richhill Township: Wasmuth & Callahan 1 Mary Goodwin, 2,695 ft.
Whiteley Township: Lewis Petit et al 1 Lee Shields, building rig.

Indiana County

Brush Valley Township: T. W. Phillips 1 F. M. Ramsey, 1,200 ft.

(Continued on Page 206)

POWER

21 Continental Red Seal SIZES

CONTINENTAL MOTORS · AMERICA'S STANDARD

Whether for spudding, drilling, pumping (individually or from central power plant) generator service for power or lighting, the operator must give careful consideration to power units that are built to "take punishment." Continental Red Seal Engines can "take it," because they're built for it.

1. Quick, push-button starting.
2. Individual porting (an exclusive patented Continental feature) which means smooth balanced power.
3. Full length of cylinders surrounded by water for efficient cooling with jackets designed to eliminate hot spots.
4. Precision, interchangeable steel backed bearings.
5. Dust and dirt proof crankcase.
6. Cast iron base with extra large oil capacity available for all models.

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316 Thompson Building, Tulsa, Okla.
STANDARD TOOL & MACHINE CO.—Longview Texas

Extend Wilkins Northwest to Within One Mile of Holyrood

By
DAL DALRYMPLE

FALLS CITY, Neb., Sept. 16.—E. J. Shaffer 1 Sandrock, SW NW 20-1n-16e, south edge of the Falls City pool, was reported flowing 55 bbl. of oil an hour after plugging back to 2,310 ft., perforating at 2,226-62 ft. with 116 shots in Misener sand and Hunton lime, and acidizing with 2,000 gal. If that rate of flow is maintained on completion test it will be the largest producer in the field. It failed to develop commercial production in Viola lime at 2,797-2,874 ft., although finding showings in that formation.

The Wilkins pool in Ellsworth County, Kansas, was extended ¾ mile northwestward at Vickers Petroleum Co. 1 Peterman, N½ NE NE 14-17-10w, bringing production to within 1 mile of Holyrood townsite. The Arbuckle zone was topped at 3,263 ft., where 7-in. casing was set, and drilled to 3,286 ft. Oil rose 700 ft. in the hole within a few hours after plug was drilled. Potential test was to be made after acidizing.

Further proof that Lansing lime wells in the Hall and Gurney areas of Russell County are producing from a common source was given at Skelly Oil Co. 5 Ben Rein, N½ S½ SW 25-14-14w, an intermediate well south of the town of Russell. It made daily potential of 1,441 bbl. of oil at 2,980 ft. in Lansing lime.

Prospective extension of the Iuka pool, Pratt County, more than 1 mile northeastward, remained in doubt at Marylyn Oil Co. et al 1 Jackson, CEL NE NW 1-27-13w. It had showings of oil in Lansing lime topped at 3,721 ft., Viola lime topped at 4,132 ft. and in Simpson zone topped at 4,201 ft. Some water was reported showing at 4,241 ft., total depth. Operators were due to shoot and test.

Estimated Daily Production

Estimated daily production for Kansas for the week ended September 14, and for the preceding week, was as follows:

	Barrels	
	Sept. 14	Sept. 7
Oxford City	700	700
Burrton	8,400	7,900
Ritz-Canton	4,250	4,150
Graber	2,450	1,750
Hollow-Nikkel	1,450	1,850
Lerado	650	700
Voshell	1,650	1,700
Wellington	1,750	1,650
Ellsworth County:		
Lorraine	1,650	1,250
Other pools	3,100	2,330
Rice-Barton counties:		
Bloomer	4,550	2,750
Chase	4,800	4,200
Geneseo	3,900	2,750
Raymond	800	1,200
Silica	15,800	11,600
Keesling	900	600
Wherry	4,000	3,300
Miscellaneous Barton	8,150	7,495
Trapp district	14,450	10,450
Balance Russell County	18,950	15,650
Sedgwick County	3,300	3,250
Ellis County:		
Bemis	12,050	8,800
Miscellaneous	9,110	8,320
Kingman County	350	325
Stafford County	10,100	9,490
Greenwood County	9,000	8,850
Eldorado	7,400	7,400
Other fields	40,940	35,340
Total Kansas	194,600	165,750

WILDCAT COMPLETIONS

Cowley County: Continental 1 Breon, E½ SW SE 4-35-4, Mississippi 3,250 ft., Simpson 3,656 ft., Arbuckle 3,682 ft., T.D. 3,710 ft., dry.
Lyon County: Connell & McKnab 1-B McKee, SE NE NE 32-21-11, Mississippi 2,102 ft., T.D. 2,106 ft., no Bartlesville, dry.
Marion County: Rex & Morris 1 Rudolph, NE NE SE 36-17-3e, Mississippi 2,414 ft., T.D. 2,477 ft., dry.
McPherson County: Sunray 1 Ely, NW NW NE 5-21-5w, Mississippi 3,409 ft., T.D. 3,452 ft., dry.
Pratt County: Cities Service 1 Lehrling, NE SW SW 19-27-11w, Viola 4,317 ft., Simpson zone 4,391 ft., Arbuckle 4,513 ft., T.D. 4,529 ft., dry.
Rice County: R. E. Buckles 1 Ramsey, E½ SE SE 9-18-7w, Arbuckle 3,324 ft., T.D. 3,339 ft., dry.
Sedgwick County: G. A. Fuller and others 1 Stitt, S½ SE NE 21-27-1w, Kansas City 2,652 ft., T.D. 2,806 ft., pumped 70 bbl. of oil in 8 hr., later was acidized and last May made potential of 23 bbl. of oil with 600 bbl. of water, production declined to where it was pumping 1 bbl. of oil and 60 bbl. of water daily, temporarily abandoned.
Shawnee County: William Corbett and others 1 Security, S½ S½ NW 28-11-15, Bartlesville 1,708 ft., Mississippi 1,763 ft., Hunton 2,115 ft., T.D. 2,170 ft., dry.

FIELD COMPLETIONS

Barton County

Trapp field: A. G. Kaiser 1 Sausen, W½ SW SW 12-16-14w, Arbuckle 3,328-33 ft., T.D., swabbed 102 bbl. in 8 hr., acidized with 1,000 gal., potential 3,000 bbl.
Silica field: Lario et al 2 Reiser, N½ NE NW 23-20-11w, old well deepened from 3,292 ft. to 3,301 ft., acidized with 1,000 gal., potential 3,000 bbl., old potential 1,887 bbl.

Butler County

Miscellaneous: Rex & Morris 7-A De Moss, SW NW NW 8-28-7, Bartlesville pay 2,622-63 ft., T.D. 2,669 ft., initial yield 45 bbl. daily.

Cowley County

Couch pool: Ryan Consolidated 1 Hunsacker, SW SE NE 13-30-5, Bartlesville pay 2,772-2,830 ft., T.D., potential 152 bbl. oil, no water.
West Biddle area: W. M. McKnab 3 Southwestern College, W½ W½ SE 11-32-4, Arbuckle 3,448 ft., T.D. 3,454 ft., dry.

Ellis County

Bemis field: Cities Service 18 Collahan, NW SE SW 24-11-17w, Arbuckle 3,483-89 ft., T.D., acidized with 500 gal., potential 3,000 bbl.
Burnett field: Skelly 7 Kempe, S½ NE NW 12-11-18w, Arbuckle 3,368 ft., pay 3,393 ft., T.D. 3,409 ft., swabbed 105 bbl. in 6 hr. through casing, potential 3,000 bbl.
Walter pool: British American 3 Karlin, N½ SW NW 13-12-18w, Arbuckle 3,689-99½ ft., T.D., acidized 1,500 gal., pumped 66 bbl. oil in 8 hr., potential 178 bbl.

Ellsworth County

Ehler area: Lauck & Moncrief et al 2 Meyer, N½ N½ NW 35-16-10w, Arbuckle 3,277-88 ft., T.D., potential 3,000 bbl.
Stoltenberg field: Atlantic & Stanolind 3-E Stoltenberg, S½ SW SE 27-16-10w, abandoned location.
Palmer & Atlantic 4-B Stoltenberg, E½ NE NW 27-16-10w, Arbuckle 3,277-88 ft., T.D., potential 3,000 bbl.
Aylward Production 1 Horejsi, W½ NW SW 5-16-10w, Arbuckle 3,310 ft., T.D. 3,319 ft., dry.
Stratman area: Cities Service 2 Stratman, N½ SW SW 36-16-10w, Arbuckle 3,296 ft., T.D. 3,303 ft., acidized 500 gal., pumped 260 bbl. of oil in 13 hr., potential 3,000 bbl.
Wilkins pool: Mudge Oil 1-A Schroeder, SE SE NE 30-17-9w, Arbuckle 3,212 ft., T.D. 3,216 ft., acidized 1,000 gal., pumped 40 bbl. oil in 8 hr., potential 120 bbl.

McPherson County

Bornholdt field: Cities Service 1 Holgerson, W½ SW NE 20-20-5w, chat 3,356-95 ft., T.D., flowed 50 bbl. of oil an hr., potential 2,950 bbl., calculated.
J. E. Crosbie, Inc. 1 Wright, S½ NE SE 13-20-6w, chat 3,318-28 ft., T.D. 3,352 ft., flowed 60 bbl. of oil in 2 hr., potential 109 bbl.
Sunray 1 Pearson, W½ SW NE 18-20-5w, chat 3,338-61 ft., T.D., flowed an estimated 100 bbl. oil an hr., potential 3,000 bbl.

Rice County

Bloomer field: Transwestern et al 4 Roesler, N½ NE SW 6-18-10w, Arbuckle 3,239-64 ft., T.D., potential 3,000 bbl.
Geneseo field: Continental et al 7-A Pickerill, SE SW NE 24-18-8w, Arbuckle 3,157-73 ft., T.D., pumped 143 bbl. oil in 4 hr., potential 3,000 bbl.

Russell County

Gurney pool: Alva Billings et al 1-A Hill, SE SE SW 16-14-14w, Lansing 3,025 ft., pays 3,105-12 ft. and 3,117-45 ft., T.D. 3,153 ft., acidized, pumped 610 bbl. oil in 8 hr., potential 1,830 bbl.
Hall pool: Skelly 13 Opdycke, N½ SE NW 32-14-13w, Lansing 2,865-76 ft., T.D., acidized 6,000 gal., pumped 312 bbl. oil in 8 hr., potential 934 bbl.

Stafford County

South Sittner pool: W. F. Hooper 1-A Siefkes, S½ SE SE 34-21-12w, Arbuckle 3,760 ft., T.D. 3,764 ft., dry.
South Snider pool: Cities Service 5 Smith, W½ NW SW 16-21-11w, Simpson sand 3,377 ft., pay 3,378-85 ft., T.D., shot in sand, flowed 543 bbl. in 8 hr., potential 1,630 bbl.
Zenith field: Magnolia 1 Tretbar, SW SE SE 12-24-11w, old well completed for original potential of 472 bbl. of oil at 3,744 ft. in Misener sand; deepened to Viola at 3,738 ft., T.D. 3,782 ft., acidized with 3,000 gal., new potential 3,000 bbl.
E. H. Moore, Inc. 3 Stewart, S½ NE SW 12-24-11w, old well deepened, old total depth 3,751 ft., old potential 275 bbl., deepened to Viola at 3,745 ft., T.D. 3,798 ft., acidized with 3,000 gal., new potential 3,000 bbl.
Transwestern 3 Johnson, E½ SW SE 3-24-11w, Viola 3,711-75 ft., T.D. flowed 406 bbl. of oil in 10 hr., acidized with 5,000 gal., potential 3,000 bbl.

FIRST REPORTS

Barton County

Shell 3 Peterman.....SE cor. 13-16-14w.

Ellis County

Bay Petroleum 2-A Kempe.....E½ SE SW 31-10-17w
Bishop Oil 1 Gunther.....S½ SW NE 2-12-18w.
Gulf 1 Alex.....N½ SE SE 30-13-16w.
Phillips 8 Peavey.....S½ SE SE 13-11-18w.
L. H. Wentz 1 Burnett.....S½ SW SW 1-11-18w.

Ellsworth County

Atlantic 3-A Stoltenberg.....S½ NE SE 27-16-10w
Lauck & Moncrief et al 5 Ehler.....S½ SE NE NW 35-16-10w.
Magnolia 2 Skalicky.....E½ SW NW 9-16-10w.
Magnolia 1 Horejsi.....W½ NW NW 17-16-10w.
Phillips & Atlantic 2 Hagy....E½ NW SW 16-16-10w.

Greenwood County

Charles Barker et al 2 Butcher.....S½ NE SW NE 17-28-11.
Houston-Oklahoma Oil 9 Berry..S½ NE SW 28-23-13.

Marion County

H-L-N Oil 1 Neiwurth.....N½ NE SE 30-17-4.

McPherson County

Cities Service 2 Nyquist.....S½ SE NW 19-20-5w.
Westgate-Greenland 2 Union....W½ SW NE 18-17-1w.

Norton County

H. A. Steele 1 Becker.....C SW NW 25-4-21w.

Rice County

Cities Service et al 6 DeWitt....W½ E½ NE 33-19-9w.
Continental et al 8-A Pickerill..NW SW NE 24-18-8w.
W. N. Bartlett 2 Houston.....S½ NW NW 19-20-10w.
McPherson Drilling 6-A Cramm..NE NE NW 15-19-9w.

Rooks County

Broadview Oil et al 7 Livingood..S½ NW NW 11-9-16w.
Cities Service 2 Buell.....S½ NE SW 10-9-16w.
John Washabaugh 1 Baxter.....S½ SW SE 2-9-16w

Russell County

Phil-Han et al 2 Neidenthal..E½ NE NW 13-14-15w.
Skelly 14 Opdycke.....S½ NW NW 32-14-13w.
Skelly 6 Ben Rein.....N½ S½ SW 25-14-14w.

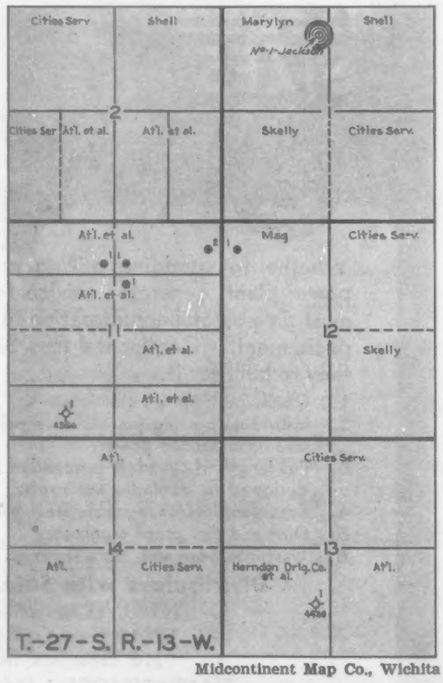
Sedgwick County

W. N. Bartlett & Simpson Oil 1-A Schmitz.....E½ SE SW 5-28-1w.

WILDCAT DRILLING REPORT

Barber County

Barbara Oil 1-A Angell.....NE SE 10-33-14w
Cemented 10-in. 360 ft., drilling below 3,980 ft.
Derby Oil and Crow Oil 1 Hancock....SE SE 10-32-12w
Kansas City 3,745 ft., drilling below 3,825 ft.



Midcontinent Map Co., Wichita

The Iuka pool in Pratt County may be given a long northeast extension if efforts to complete a producer at Marylyn Oil 1 Jackson, Section 1-27-13w, are successful. Although reported showing water at total depth of 4,241 ft., it found showings of oil in Lansing, Viola and Simpson zones

Cowley County

Sage, Murfin & Markey 1-A Carlson . . . . . CWL SW SW 21-30-3e
Mississippian 3,015 ft., 5-in. 3,020 ft., T.D., waiting.

Ellsworth County

Duwe, Farris & Royer 1 Rathbun E½ NE SE 6-17-8w
Neva 1,730 ft., drilling below 2,505 ft.

Greenwood County

Ward McGinnis 1 Sharp . . . . . SW SW 9-28-12e
First report. Moving in machine.
A. D. Allison et al 1 Short . . . . . NE NE NE 10-24-11e
Set 10-in. 800 ft., drilling below 1,150 ft.

Kearny County

Stanolind 1 Judd . . . . . SE SE 15-21-38w
T.D. 6,071 ft. in granite, to test through perf. at 3,785-96 ft.

Pratt County

Marlyn Oil et al 1 Jackson . . . . CEL NE NW 1-27-13w
Lansing 3,721 ft., show oil 3,721-23 ft., show oil 3,895-3,911 ft., Viola 4,132 ft., show oil 4,176-78 ft., show oil in core 4,178-94 ft., Simpson 4,201 ft., show oil and gas in core 4,214-21 ft., spotted saturation in core 4,221-31 ft., cemented 7-in. at 4,226 ft., rigging up standard tools.

Rice County

Alpine O. & R. 1 Fair . . . . . CSL SE NW 10-21-9w
Cemented 10-in. 90 ft., waiting on cement.

Russell County

Jones & Shelburne 1 Lewis . . . SW SW NE 28-14-12w
Anhydrite 591 ft., 10-in. 601 ft., drilling below 1,400 ft.
J. R. Robertson et al 1 Radke . C S½ SE SW 18-15-14w
Anhydrite 917 ft., 10-in. 930 ft., drilling below 1,520 ft.

Stafford County

Selby O. & G. 1 Blackburn . . . . CEL SE NE 13-24-12w
First report. Building rotary rig.
Shell and Atlantic 1 Riley . . . . SW SW SW 28-23-11w
Lansing 3,323 ft., Sooy 3,643 ft., Viola 3,648 ft., Simpson 3,697 ft., Arbuckle 3,762-72 ft., T.D., shot 3,483-93 ft. and 3,451-61 ft., acidized, on potential test.

Forest City Basin

ST. JOSEPH, Mo., Sept. 16.—The day of Viola lime production in the Falls City pool, Richardson County, Nebraska, was delayed when E. J. Shaffer announced he was plugging back to Hunton lime at 1 Sandrock, SW NW 20-1n-16e. The Viola was topped at 2,797 ft., good showings of oil were found in cores at 2,847 ft., and it was thought production in the zone would be a certainty. Water encroached, however, and after two small treatments of acid failed to stimulate production the operator decided to plug back. It had some saturation in Hunton lime at 2,229-2,321 ft. This section was much thicker than in other wells drilled in the pool.

After long delay the Falls City area apparently is finding market outlets. R. L. Campbell announced that oil from his 1 Schock, SW SE NW 20-1n-16e, would be taken by Stanolind Pipe Line and Stanolind Crude Oil Purchasing Co. The oil is to be trucked to Stanolind's Topeka pumping station and put in its line to the Neodesha, Kans., refinery. It also was reported oil from Skelly Oil Co. 1 Davisson, SW NW NE 20-1n-16e, would be taken by Stanolind. The Schock well is rated at more than 500 bbl. daily, the Davisson at about 720 bbl. daily.

Union Pipe Line Co. of Centralia, Ill., announced it would begin construction of a gathering system at once, the first connection to be to Harry Harper 1 Sibbernsen, SE NE NW 20-1n-16e, a 744-bbl. producer. The oil will be piped to a loading rack at Falls City, whence it will be taken by rail to Minneapolis. The company's decision to begin laying the line was made following an Interstate Commerce Commission order cutting the freight rate on crude to Minneapolis from 30 cents to 21 cents for 100 lb., equivalent to approximately 65 cents a barrel.

If the Shaffer 1 Sandrock is completed as a Hunton producer it will be the seventh in the Falls City pool. Skelly 1 Wallraff, 20-1n-16e, may be the eighth producer. It found Hunton lime at 2,217 ft., with oil showing, and pipe was being run for a test.

R. L. Campbell 2 Schock, NW NE 29-1n-16e, was spudded. It is a farmout from Phillips Petroleum Co.

Robert McIntyre 1 Boice, NE NW NE 18-1n-16e, offset to the discovery well, is a location. It is on a 40-acre lease assigned to Harry Harper, contractor who drilled the discovery for Pawnee Royalty Co. Harper farmed it out to Black Gold Operating Co., which in turn farmed it to McIntyre.

Status of other southeastern Nebraska tests is as follows:

Richardson County

Uhri 1 Stauffer, SW SW NE 22-1n-13e, S.D. 1,605 ft.
M. J. Lewis et al 1 Wittwer, NW NW NE 22-1n-14e, Hunton 2,350-2,406 ft., to run electrical survey.
Forest City Basin Synd. 1 Windle, SE NE SE 3-1n-15e, base K. C. 1,225 ft., drilling below 2,010 ft.
W. H. Martgan et al 1 Smith, C NW NW 31-3n-16e, location.

Nemaha County

Frank Engles et al 1 Wheeler, NE NE NE 9-4-14e, drilling below 1,300 ft.
Richards, Clamplit & Ogden 1 Lambert, NE SW 26-4n-15e, location.
E. W. Schrock et al 1 Rogge, NW NW NW 17-5n-13e, drilling below 1,957 ft.
Bow & Arrow Oil 1 Schreifer, N½ NE SW 20-5n-14e, drilling 817 ft.
Bow & Arrow Oil 1 Wrightsman, W½ SW NW 36-6n-14e, drilling 210 ft.
Black Gold Operating 1 Magor, C NE NE 15-5n-15e, drilling 2,020 ft.
Nemaha County Corp. 1 Lehr, C SE SE 25-5n-14e, S.D. 1,335 ft.

Otoe County

H. A. Risk et al 1 McCord, NW SW SW 15-8n-14e, set 10-in. casing 720 ft.

Missouri Operations

In the Missouri sector of the basin O. M. Evans 1 Leamer, SW SW 29-55n-28w, Caldwell County, bottomed at 405 ft., was to be plugged back and shot. Last gas well to be completed by Evans was incorrectly listed as 1 Leamer, but should have been 1 Dixon,

(Continued on Page 214)

California Fields

(Continued from Page 202)

T.D. 3,522 ft., abandoned in hard green conglomerate, top Vaquero formation (Miocene) 3,187 ft., Sespe formation not reached, section correlated with 1 Leonis in 3-6n-33w which Tide Water Associated drilled and abandoned as a duster several years ago, Santa Barbara County.

Ventura Avenue Field

Associated 116 Lloyd 29-3n-23w
Flowed on compressor 29 bbl., 30.8-gravity, 3.4 per cent cut, T.D. 8,940 ft., 6⅝-in. water string cemented 8,540 ft., 449 ft. of 4¾-in. liner including perf. 8,552-8,935 ft. landed 8,935 ft., 8,438 ft. of 2½-in. tubing, Ventura County.

COASTAL DISTRICT DRILLING REPORT

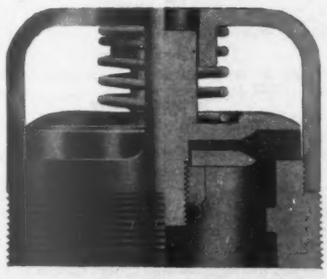
Betteravia District

Union 2 Pezzoni 33-10n-35w
Drilling 7,490 ft. in Sisquoc sand and shale, Santa Barbara County.

Coal Oil Point District

Bolsa Chica 191-7 Permit 25-4n-29w
Repairing pier and rigging up, will be drilled from a 100-ft. pier and bottomed out beneath Pacific Ocean by directional drilling; first well drilled by

KEEP DOWN THE UPKEEP OF PIPE LINE PUMPS WITH LONG LIFE "L-K" PUMP VALVES



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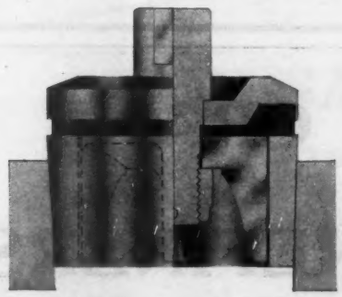

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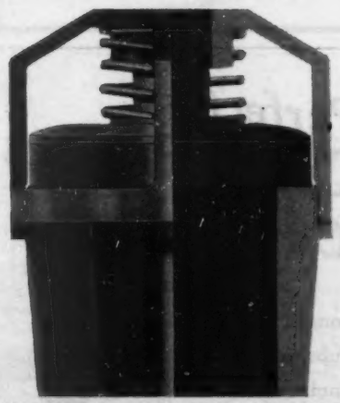

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L-K PUMP VALVE CO. HOUSTON TEXAS L-K

L-K PUMP VALVE COMPANY
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Bolsa Chica Oil Co. showed good odor in Vaqueros but nothing in Sespe, later another operator took over the hole and whipstocked out into the ocean without success, a second attempt was made by whipstocking beneath the uplands, but failed to find production, Santa Barbara County.

Sespe District

Merchants 8 Cochran.....1-4n-20w
Drilling 2,752 ft. in hard sand of Sespe formation of lower Miocene age, objective is Eocene.

Appalachian Fields

(Continued from Page 203)

Center Township: T. W. Phillips 2 Helvetia Coal Co. 3,170 ft.
South Mahoning Township: John Wray et al 2 James Lukehart, 2,050 ft.
T. W. Phillips 1 Thomas Hoover, 1,035 ft.
T. W. Phillips 1 Jesse Williamson, 2,315 ft.
Washington Township: Peoples 1 Calvin Cribbs, 2,428 ft.
T. W. Phillips 1 J. W. Johnston, 1,898 ft.
T. W. Phillips 1 C. M. Brewer, 927 ft.
White Township: T. W. Phillips 1 Aber & Altismus, 2,568 ft.
T. W. Phillips 1 Martha B. Campbell, 900 ft.

Washington County

Amwell Township: Carnegie 2 W. C. Horn, 666 ft., Pittsburgh Coal 632 ft.
Orrill et al 1 Membs Lantz, 2,679 ft.
Hopewell Township: John Johnson et al 1 Robert Stevenson, 585 ft., Pittsburgh Coal 280 ft.
Robinson Township: R. M. Duden et al 2 Herman Baier, 960 ft.
South Franklin Township: A. V. Lewis et al 3 B. A. Bonham, 1,825 ft.
A. V. Lewis et al 1 Frank Gilbert, building rig.
Somerset Township: Carnegie 1 Mildred A. Nichol, location.

Westmoreland County

Allegheny Township: Apollo Gas Co. 1 Anderson, 555 ft.
Hyde Park Foundry 2 Andrew Grinder, reaming to 747 ft.
Bell Township: Peoples 1 John McCreary, drilling past tools 307 ft.
Franklin Township: Peoples 1 Henry Swank, 1,934 ft.
Derry Township: Latrobe Steel Co. 1 Keystone Coal Co., 2,160 ft.

WEST VIRGINIA

In Grant district, Harrison County, the rotary test of the Hope Natural Gas Co. on the G. S. Gribble farm continues to make excellent time with the tools now at 6,465 ft. and drilling in dark gray shale. The Lower Devonian is expected around 7,200 ft.

In Jackson County, the wildcat of the Columbian Carbon Co. on the P. F. Riggs farm in Ravenswood district is down 822 ft. Here, Guy Boggess and others are drilling at 1,630 ft. on the H. L. Tallman farm. In Tygart district, Wood County, the wildcat of Glenn Roberts and others on the C. W. Cook farm has reached 4,130 ft.

Braxton County

The Injun sand oil in the Pittsburgh & West Virginia Gas Co. 7735 A. L. Morrison in Birch district, Braxton County, has increased greatly from the completion report and has now made as high as 77 bbl. in 21 hours. So far, it has produced over 400 bbl.

Birch district: Z. N. Connelly 1 Dewey Baker, ½ mi. W Astor siding, dry. Big lime 1,601-97 ft., Big Injun 1,697-1,862 ft., slate 1,802-58 ft., water 1,087 ft., show gas 1,285 ft.

Calhoun County

Sheridan district: Metz Farm Oil Co. 7 Peter Metz, 10 bbl., Salt sand, T.D. 1,873 ft.
Sherman district: Creed Yoak et al 1 Edith McDonald, 5 bbl., Injun sand, T.D. 2,214 ft.

Hancock County

Grant district: H. J. Braden Co. 58 C. E. Brenneman, 3 bbl., Berea sand, 849 ft.

Kanawha County

Big Sandy district: Rex 1 A. J. & Bettie Kelly, 80,000 cu. ft. gas, 1,947 ft.

Monongalia County

Clay district: Roy W. Clovis 1 G. W. & Perry Johnson, dry, gas sand, T.D. 1,330 ft.

Putnam County

Curry district: E. J. Elkins 1 G. G. Tallman et al, 2,160,000 cu. ft. gas, Salt sand 924-1,472 ft., Big lime 1,491 ft., gas 1,530-40 ft., T.D. 1,572 ft.
H. C. Morton, trustee, 1 E. M. Callahan, Berea, 160,000 cu. ft. gas, T.D. 2,100 ft.

Ritchie County

Murphy district: Clem S. Morris 1 E. D. Wright, 88,000 cu. ft. gas, Injun sand, T.D. 2,040 ft.

Wetzel County

Magnolia district: Clark Fagert 1 Beatrice Yeater, 200,000 cu. ft. gas, Cow Run sand, 630 ft.

Wirt County

Newark district: G. L. Shimer 1 William Fought, 29,000 cu. ft. gas, gas sand dry in Injun sand, T.D. 1,900 ft., plugged back to gas sand.

Kanawha County

No wells were completed in the Oriskany fields in Kanawha County. Some additional locations were made.

Poca district: G. L. Cabot 3 D. Holmes Morton, drilling 1,970 ft., Big lime gas testing 500,000 cu. ft.
G. L. Cabot 4 J. T. Bonham, top Corniferous lime 4,954 ft.
United Carbon 1 R. S. Milam, 1,940 ft., in Salt sand.
Columbian Carbon 1 George W. Spencer, top Corniferous 4,732 ft.
Columbian Carbon 1 Fay E. Hughart, top Corniferous 4,896 ft.
Linden Drilling 2 J. W. Harding, top Corniferous 4,688 ft.

NEW WORK

Braxton County

Birch district: Pittsburgh & West Virginia 7767 Erastus Fulks, elev. 1,026.5 ft.
Pittsburgh & West Virginia 7768 C. N. Snodgrass, elev. 1,112 ft.

Cabell County

Barboursville Fuel Gas 1 L. E. Browning, elev. 627 ft.

Clay County

Otter district: Pittsburgh & West Virginia 7673 W. E. Butler, elev. 970 ft.

Gilmer County

Pittsburgh & West Virginia 7742 Flossie Snodgrass, elev. 1,223 ft.

Jackson County

Washington district: Walter Beren 4 H. Clay Caste, elev. 713 ft.
Ripley district: United Carbon 1 B. B. Meadows.

Kanawha County

Poca district: United Carbon 869 Robert Wines et al.
United Carbon 870 William Wines et al.
United Carbon 871 Q. O. Tolley.
United Carbon 872 Lillie Sigman.
United Carbon 873 J. W. Burdette et al.
United Carbon 874 A. S. Peters et al.
Washington district: Owens Libby Owens 9 Siler Coal Land Co., elev. 848 ft.

Lincoln County

Harts Creek: F. H. Yates 2 Harmon Stroud, 1,407 ft.

Monongalia County

Grant district: Owens Libby Owens 2 Luther Howell, elev. 1,312.3 ft.

Pleasants County

Lafayette district: Sud Powell 2 J. S. Uminsetter, elev. 1,017.5 ft.

Putnam County

Curry district: Summit Gas Co. 1 John S. Burdette, elev. 832.6 ft.

Ritchie County

Murphy district: G. L. Ballentine 1 G. S. Tibbs, elev. 698 ft.
Grant district: R. C. Jackson 1 E. H. McGinnis, elev. 1,024 ft.

Roane County

Harper district: American Oil Dev. 1 R. H. Romine, elev. 1,045.84 ft.

Upshur County

Banks district: Central Oil & Gas, 1 E. E. Friend, elev. 2,445 ft.
Meade district: Long Run Oil & Gas 1 E. L. Morrison, elev. 1,943 ft.

Wood County

Walker district: Stillwell 1 Scudder Alleman, on Stillwell Creek.

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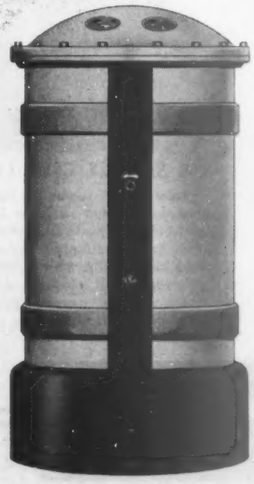

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LOUISIANA GULF COAST

Discovery in Lake Salvador; Showings at Bayou Perot

By NEIL WILLIAMS

NEW ORLEANS, La., Sept. 16.—The discovery of a new oil field in the Lake Salvador area, St. Charles Parish, and the favorable showings logged in another wildcat in the Bayou Perot area, Jefferson Parish, were the highlights of development in coastal Louisiana the past week.

Texas 1 State located in Lake Salvador, several miles northwest of the Barataria field in St. Charles Parish, perforated casing at 9,775-9,800 ft., and the well flowed at the rate of 626 bbl. of 35.3-gravity oil per day on a 12-hour gage through a ¼-in. choke on the drill stem. Working pressure built up to 2,700 lb. After the test was made the well was tested on a 10/64-in. choke and flowed an unestimated amount of distillate, and the working pressure increased to 3,750 lb. At the close of the week, the testing tool was being pulled and the company is expected to squeeze off the perforations and retest. Drilled to a total depth of 10,501 ft., the hole was plugged back to 9,805 ft., and 7-in. casing was cemented at 10,222 ft. It is reported that three sand sections all of which showed oil were logged, but details as to where they were cored were not available. The well is located on a geophysical block consisting of several thousand acres centering around 26-16s-22e.

In the same area, but located northwest of the Delta Farms field in Jefferson Parish, interest was centered on Texas 1 State located near the mouth of Bayou Perot, which is drilling in shale below 1,120 ft. after passing up five sand sections all of which showed oil or gas. These sands were logged as follows: 6,900-20 ft., 8,710-43 ft., 8,774-8,810 ft., 9,506-40 ft. and at 9,750-66 ft. The section at 9,506-40 ft. was logged as a gas sand. Location is in 26-16s-22e.

Welsh Dome Flank Test

D. A. Cheesman and Cranston 1 A. Bourgeois, an interesting southeast flank test at the Welsh dome, Jefferson Davis Parish, is shut down waiting on orders after the well flowed gas and distillate on a drill-stem test through perforated casing at 5,320-26 ft. This is the second sand section to be tested as previous drill-stem tests at 5,581-93 ft. recovered distillate and tested an unestimated amount of gas.

Plymouth 1 LeBlanc, the second well drilled in the Bayou Pigeon field, Iberia Parish, flowed at the rate of 576 bbl. per day through a ¼-in. choke. Tubing pressure was 350 lb. and casing pressure 650 lb. The completion was made in the discovery pay at 8,054-68 ft. The rig is being moved in for 1 State in 24-12s-10e.

Wilcox production in the Ville Platte field, Evangeline Parish, was extended further to the southeast with the completion of Danciger 1 Hirsch which flowed 725 bbl. per day through a ¼-in. choke, with tubing pressure 1,450 lb. and casing pressure 1,600 lb. Production is from perforated casing at 10,125-45 ft. Location was made in the same area for the company's 1 Pitre in 39-4s-2e.

With the completion of Atlantic 2 A. D. Whitmer as a south extension producer for the Neale field, Beauregard Parish, interest in the field is centered on Martex 1 Musser-Davis Lumber Co., an east outpost which is drilling below 8,600 ft. with no shows reported. At this depth the well is approximately 200 ft. below the discovery pay and the prospect of a producer is not encouraging.

Iowa Field

West of production in the Iowa field, Calcasieu Parish, Phillips Petroleum Co. has taken leases on acreage centering in Sections 11 and 14, Township 9s, Range 7w, as a result of the recent discovery of a new deep sand in the field by Magnolia Petroleum Co. Prolific production was opened at approximately 8,200 ft., and two old wells in the field are now being deepened to the new pay.

In the Lake Long field, La Fourche Parish, Fohs Oil Co. is retesting 12 State after the well flowed 80 bbl. of 43-gravity oil per day when tested through perforated casing at 9,343-46 ft. The perforations were squeezed off and the well is being tested through perforated casing at 9,346-51 ft.

On the Calcasieu Lake dome, Cameron Parish, Superior 3 State is drilling below 12,400 ft. and is reported to still be in the Miocene section. This well logged several showings of oil and gas below 9,700 ft., but testing failed to develop commercial production.

Magnolia 11 G. W. Farquhar, on the west side of the old Lockport field, Calcasieu Parish, which has been in the process of completion for several weeks, flowed at the rate of 120 bbl. of oil per day through a ¼-in. choke. The well was originally completed for a gas and distillate producer at 6,704-12 ft., and was plugged back and completed at 6,594-6,604 ft.

Material was being moved in for two new tests in the Schooner Bayou field by Union Oil Co. of California. No. 1 Vermilion Parish School Board is an east offset to the discovery well, while 4 Louisiana Furs Co. is located more than a mile east.

LOUISIANA GULF COAST COMPLETIONS

Acadia Parish

North Crowley field: Vicent & Welch 1 Lutcher-Harmon, 659 bbl., ¼-in. choke, perf. casing 8,787-92 ft., T.D. 8,834 ft.

(Continued on Page 214)

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TEXAS GULF COAST

Mount Houston Test Produces Heavy Oil From Frio Sand

By NEIL WILLIAMS

HOUSTON, Tex., Sept. 16.—Commercial production was opened on the old Mount Houston prospect, just northeast of Houston in Harris County, as H. C. Cockburn et al 1 George Burkitt was flowing an estimated 3 to 4 bbl. of 23.2-gravity oil per hour through a ¼-in. choke while testing through perforated casing at 4,068-74 ft. Drilled to a total depth of 4,950 ft., the hole was plugged back to 4,114 ft. and 5½-in. casing was cemented at 4,120 ft. after an electrical survey showed a maximum 8 ohms resistivity in a sand section at 4,059-89 ft. The showing of the survey was confirmed by 10 side-wall cores at intervals from 4,059-89 ft., which carried a good oil odor.

The well is located in the Jackson E. Bundick Survey in an area which has been considered a favorable prospect for a number of years. It is situated about 1 mile southeast of Jack W. Frazier 4 Griffith, recently completed as a gas well at 3,482-85 ft. and just south of a deep test which logged favorable showings in the same sand section, but failed to produce when tested.

The significant feature of the completion is that the sand section has been identified as the Frio formation, which heretofore has only been proven productive farther downdip in the southern part of the county. It is generally believed that the well is located on a salt-dome type of structure, and that the Frazier gas well is separated from the main part of the structure by a faulted condition.

Ogburn Field

Prospect of a southwest extension to the Ogburn field, Harris County, was not encouraging as Christian-Carpenter and Joyce Richardson 1 Rorick recovered 3,000 ft. of salt water on a 32-minute drill-stem test at 6,645-82 ft. and is coring ahead for the 6,900-ft. pay. The 6,600-ft. sand is the same section from which oil production was opened in the field the previous week by the completion of W. L. Goldston 1 Josey. An earlier test at 6,396-6,421 ft. recovered 2,500 ft. of salt water.

The Sheridan field, Colorado County, received its third Wilcox sand producer as Shell Oil Co., Inc., completed 2 Plow Realty Co. for an initial production of 301 bbl. in 12 hours, flowing through a ¼-in. choke. Tubing pressure was 800 lb. and casing pressure 810 lb. The well was drilled to a total depth of 8,158 ft. and was completed with 5½-in. casing cemented at 8,143 ft. The completion extends production several hundred feet south of the discovery well.

Glen H. McCarthy 1 W. B. Munson, Bailey Prairie prospect, Brazoria County, was tested the second time through perforated casing at 11,180-87 ft. and the well flowed gas and salt water with a trace of distillate through open 2-in. tubing. Shut-in casing pressure was 50 lb. The well has been killed, and will be retested. Location for a wildcat was announced for the county by Gulfboard Oil Corp. for 1 K. A. Milliburn in the A. G. Reynolds Survey.

Lolita Field

On the east side of the Lolita field, Jackson County, Magnolia Petroleum Co. completed a second producer in the newly opened 6,300-ft. sand. No. 2 Four Way ranch, an east offset to the discovery well, flowed 269 bbl. per day through a ⅛-in. choke from perforated casing at 6,396-98 ft. Sand in the regular pay was topped at 5,943 ft., but the well showed too much gas when tested.

With drilling already under way on five tests in Galveston Bay, piling was being driven for two more tests. Shell Oil Co., Inc., is scheduled to move a rig in for 1-199 State, 467 ft. from the northwest and southwest lines of the section, while Humble is preparing to move in drilling barge for 6-B-300 State. The most advanced test is Humble 2-A-246 State, which is coring in sandy shale below 9,365 ft. after cementing a protection string of 7-in. casing at 9,285 ft.

An increase in development of the La Belle field, Jefferson County, is anticipated following the completion of Sun 7 Broussard, completed for an initial production of 750 bbl. per day through a ¼-in. choke from perforated casing at 7,264-71 ft. This is believed to be a new producing horizon for the field, and is the best producer in the field. The majority of the wells have been completed for gas and distillate producers from sand below 8,200 ft. Location is in the B. Blackman Survey, a northwest offset to No. 4 Broussard, a distillate producer.

South China Field

Production in the South China field, Jefferson County, was extended to the east, as Titanic 1-B Fontenot was flowing oil and wash water while cleaning out through a ¼-in. choke from perforated casing at 7,880-84 ft. Tubing pressure was 1,075 lb. and casing pressure 1,475 lb. Pan American 1 L. D. Fontenot, H.T.&B. Survey, Section 17, is bottomed at 8,000 ft., and an electrical survey is being made. Sand with a gas odor and salt water test was cored at 7,858-68 ft.

Interest in development of the Wilcox trend was centered on Shepherd area, San Jacinto County, where Harrison & Abercrombie are preparing to test 1 Sun Oil Co. fee. The hole is bottomed at 8,590 ft. and 5½-in. casing was cemented at 8,400 ft. Twenty feet of shale with streaks of sand carrying a gas odor was recovered at 8,217-37 ft., while sand and shale with a gas odor was cored at intervals from 8,257-77 ft. Casing was ce-

(Continued on Page 226)

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first place

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Start Tests in Weleetka City Limits; Extend Hewitt Area

By DAL DALRYMPLE

A TOWNSITE drilling campaign was due to start at Weleetka, Okfuskee County, Oklahoma, where locations for two tests within the town limits have been staked, following the bringing in of a Booch sand producer near the west edge of the municipality. The new tests are Doak & Hughes 1 Community, SW SW NW 15-10-11, on town Lot 4, Block 112, and the 2 Community, E½ NE SE 16-10-11, on Lot 6, Block 59.

Both locations offset Doak & Hughes 2 Lowe, SE SE NE 16-10-11, west and north of town limits. The 2 Lowe flowed 575 bbl. of oil in the first 16 hours from Booch sand at 1,890-1,911 ft., total depth. Gas gaged 5,000,000 cu. ft. Gas declined rapidly and in a subsequent 24-hour period 179 bbl. of oil was swabbed from the hole. It was to be completed on the pump.

The second producer in the East Cromwell pool, Okfuskee County, was brought in at Shell Oil 1 Replogle, NE SE SE 35-11-8. It flowed 465 bbl. of oil in 24 hours from Cromwell sand at 3,445-86 ft. The company has staked locations for north and south offsets. The Texas Co. 1 Berryman, NW SE SW 36-11-8, had Cromwell sand at 3,490-3,517 ft., and swabbed 5 bbl. of oil and 21 bbl. of water in 21 hours. In the next 6 hours it swabbed only 10 bbl. of water. Testing continued.

A productive spot in the Seminole-East Seminole district apparently was opened at Justin Oil et al 1 Rhea, S½ SE SW 12-9-6. After acidizing with 1,500 gal., it was swabbed at the rate of 50 bbl. of oil in 12 hours from Hunton lime at 4,032-51 ft., total depth.

The Hewitt pool was extended or a new area opened at W. F. Turner 1 Ward, NW NW NW 28-4s-2w, Carter County. It had sand at 2,160-73 ft., and swabbed 166 bbl. of oil in 10 hours. Although only ½ mile southwest of Hewitt production, it may open a new area. The extension area between the Hewitt and Healdton fields continues busy, with producers being completed regularly. Some observers believe the Healdton and Hewitt fields will be united.

Although reports that G. E. Kadane et al 1 Andrews, NW NW NW 35-2s-19w, had opened a pool in Tillman County may have been premature, and water was reported to have intruded, it still may be completed as a producer. It was reported to have 300 ft. of high-gravity oil in the hole and was to be shot.

WILDCAT COMPLETIONS

Choctaw County: Scott 1 Scott, SE SW NE 28-7s-15e, T.D. 260 ft., dry.
Creek County: Stonehill Drlg. 1 Vann, NW SE NE 7-17-9, Wilcox 3,304-30 ft., T.D., dry.
Hughes County: Loual Drlg. 1 Stevenson, NE NW SE 24-8-10, Gilcrease sand 2,874 ft., T.D. 2,920 ft., gas est. at 7,000,000 cu. ft., with 750 lb. R.P.
Kay County: Zephyr Drlg. 1 Morrell, SW SW SE 8-28-4, Layton 2,307 ft., Bartlesville 3,118 ft., Mississippi lime 3,185 ft., T.D. 3,245 ft., dry.
Kingfisher County: Phillips Pet. 1 Grape, C NW SE 30-18-5w, Wilcox 7,585 ft., second Wilcox 7,721 ft., Arbuckle 8,160 ft., T.D. 8,226 ft., dry.
Muskogee County: Metzger & Foltz 1 Springer, SE SE NW 12-13-17, sand 2,381 ft., T.D. 2,485 ft., dry.

COMPLETIONS IN POOLS

Caddo County

Cement field: Ohio 10 Wagner, SW NW SW 12-5-9w, Noble-Olson sand 3,190-3,220 ft., T.D. 3,386 ft., set 4-in. casing 3,380 ft., potential 490 bbl. oil.
Ray Stephens, Inc. 1 Plummer, NE NW SW 34-6-10w, set 9-in. pipe 3,378 ft., T.D. 3,725 ft., P.B. 3,402 ft., pumped 45 bbl. oil.
Magnolia 7 McKenna, NE NE SE 11-5-9w, old well deepened from 2,395 ft. to sand at 3,838-88 ft., T.D., flowed 121 bbl. in 4 hr., potential 723 bbl.

Carter County

Hewitt field: Gibson 2 Walker, SE NW NE 20-4s-2w, set 7-in. casing 2,104 ft., T.D. 2,137 ft., pumped 250 bbl.
Gibson 3 Walker, SE NW NE 20-4s-2w, set 7-in. casing 2,150 ft., sand 2,152-2,204 ft., T.D., shot with 45 qt. at 2,171-2,204 ft., pumped 216 bbl.
Cox & Hamon 1 Harrell, NE NE SE SW 20-4s-2w, sand 2,018-26 ft., T.D. 2,038 ft., set 7-in. casing 2,016 ft., pumped 140 bbl.
Batson et al 4 Williams, SE SW NE 20-4s-2w, set 7-in. casing on top of sand at 1,993 ft., T.D. 2,047 ft., pumped 200 bbl.

Creek County

Kellyville district: Abraham 3-A Beaver, SW NW NW 19-17-10, old well deepened from 992 ft. to Bartlesville at 2,295 ft., T.D. 2,313 ft., pumped 40 bbl.
Mannford area: Curtis 3 Larremore, C SW NW 10-19-9, Skinner 2,086 ft., T.D. 2,118 ft., shot with 40 qt. at 2,087-97 ft., pumped 27 bbl.
Tibbens area: Tibbens 1 Yahola, SE SW SE 23-15-8, Dutcher 3,245-48 ft., T.D., pumped 14 bbl. oil and 40 bbl. water.
Tuskegee area: Beal 2 fee, NE NW NE 36-14-9, Prue 1,990 ft., T.D. 2,022 ft., dry.

Jackson County

Altus field: Matthews 2 Inklebarger, SW SE SW 3-1n-20w, Cisco lime 1,765-92 ft., T.D., acidized with 1,000 gal., pumped 5 bbl.
Altus Pet. Co. 2 Maude, SW NW NE 15-1n-20w, set 7-in. casing 1,388 ft., T.D. 1,501 ft., swabbed 63 bbl. oil in 22½ hr., pumped 44 bbl.

Latimer County

Red Oak area: LeFlore O. & G. 35 Holmes, SW NE NE 6-6-22, sand 2,183 ft., T.D. 2,472 ft., shot with 380 qt., gaged 500,000 cu. ft. gas, with 415 lb. R.P.

Marshall County

Isom Springs pool: Hewitt Trust 1 Adams, NW NE NE 6-8s-6e. Sand 545-57 ft., T.D. 560 ft., pumped 8 bbl. oil and 16 bbl. water.

Muskogee County

Beland area: J. M. Foltz 1-B Bartlett, W½ SW NW 16-14-17, T.D. 1,894 ft., pumped 12 bbl. oil.

Noble County

Billings area: Palmer 1 Reilly, NW NE NW 27-23-2w, First Wilcox sand 4,569 ft., T.D. 4,608 ft., dry.

Oklahoma County

Oklahoma City field: I.T.I.O. 12 Trosper, SE NW SW 13-11-3w, sand 4,038-48 ft., T.D. 4,050 ft., shot with 11 qt. at 4,041-57 ft., initial production 199 bbl. oil and 37 bbl. water.

Okmulgee County

Summers area: Moffett 1-A Bostable, SE NW NE 16-11-12, T.D. 200 ft., abandoned.

Osage County

Avant field: Sinclair Prairie 44 Osage, SE SW NE NE 19-23-12, T.D. 1,616½ ft., pumped 10 bbl.
Naval Reserve area: Continental 1 Osage, SW SW NE 27-24-7, T.D. 2,656 ft., dry.

Payne County

Coyle pool: Mid-Continent 2 Johnson, E½ SW SE 2-17-1e, Wilcox 4,936-64 ft., T.D., shot in sand with 24 qt., flowed 97 bbl.

Pittsburg County

Quinton field: Oklahoma Natural 1 Pope, NE SW NW 8-7-18, sand 2,017 ft., T.D. 2,169 ft., shot with 380 qt. at 2,030-2,110 ft., gaged 4,500,000 cu. ft. gas, with 345 lb. R.P.

Pontotoc County

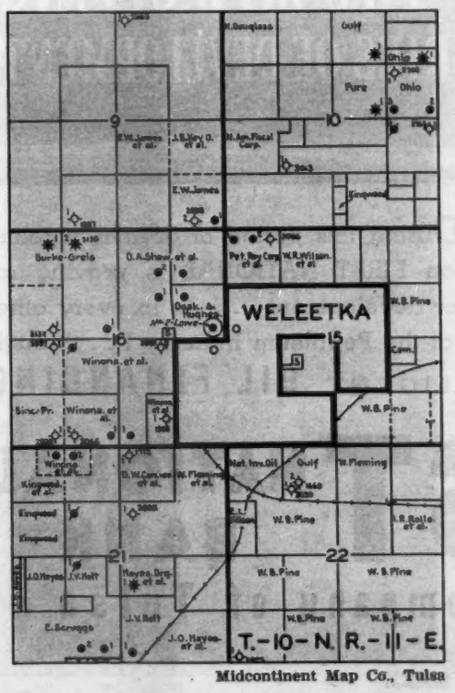
Bebee field: Henson 6 Layne, NE SW NW 30-5-5, Hunton 2,238 ft., Viola 2,404 ft., T.D. 2,522 ft., acidized in Hunton zone with 2,000 gal., pumped 60 bbl. oil and 6 bbl. water.
Garrettson 1 Roberts, NW NW SW 31-5-5, Woodford 2,250-85 ft., T.D., dry.

Stephens County

Empire field: Stogner 1 Bush, NE SW SE 4-2s-8w, T.D. 2,150 ft., temporarily abandoned.
Comanche area: George Pace et al 20 Payne, NE SW NE NW 28-2s-7w, T.D. 1,683 ft., pumped 20 bbl.
Velma area: Burkhart 1 Luster, SE SW SE 9-1s-5w, T.D. 1,580 ft., dry.

Tillman County

Frederick field: I.T.I.O. 2 Peters, SW SW NW 6-3s-18w, T.D. 3,140 ft., estimated initial production 744 bbl.



Midcontinent Map Co., Tulsa

Townsite drilling activity has started at Weleetka, Okfuskee County, as a result of the showing of Doak & Hughes 2 Lowe, north and west of the city limits, which found production in Booch sand. South and east offsets have been staked

Estimated Daily Production

Estimated daily production in Oklahoma for the week ended September 14, and for the preceding week, was as follows:

	Barrels	
	Sept. 14	Sept. 7
Allen	5,250	5,250
Billings	6,050	6,075
Burbank	7,350	7,325
South Burbank	8,025	8,025
Balance Osage	17,800	18,150
Blackwell district	3,350	3,350
Bristow-Slick	5,850	5,875
Chandler	1,050	1,075
Crescent	2,150	2,175
Cromwell	3,000	3,000
Cushing-Shamrock	9,325	9,350
Duncan	3,650	3,650
Edmond	3,825	3,800
Fish	3,175	3,225
Fitts	14,500	16,750
Jesse	2,225	2,300
Graham-Fox	2,500	2,500
Gray	850	850
Healdton	8,750	8,775
Hewitt	4,225	4,125
Keokuk	3,050	3,050
Konawa	1,100	1,100
Lucien	7,800	7,800
Moore	1,650	1,700
Northeastern counties	17,150	17,300
Oklahoma City	102,450	102,650
Olympic	2,075	2,100
Ramsey	3,725	3,750
Sasakwa	1,525	1,550
Sholem-Alechem	2,900	2,900
Seminole district:		
Bowlegs	6,625	6,650
Carr City	2,300	2,325
Dora	2,200	2,225
Earlsboro	4,025	4,050
East Earlsboro	1,800	1,825
South Earlsboro	500	525
Little River	6,725	6,700
East Little River	650	650
Maud	525	550
Mission	1,250	1,275
Seminole	6,850	6,825
East Seminole	1,275	1,275
Searight	2,050	2,100
Total Seminole	36,775	36,975
St. Louis-Pearson	25,150	25,250
Tatums-Tussy	2,875	2,825
Tonkawa-Garber-Thomas	3,650	3,650
Wewoka	1,550	1,550
Yale-Jennings	3,050	3,050
Other pools	83,550	84,750
Total Oklahoma	412,925	417,475

FIRST REPORTS

Caddo County

Huguley 2 Wagner, old well drilled deeper ..... SE NE SW 3-5-9w.

Carter County

Batson 5 Williams ..... CSL NE 20-4s-2w.
Batson 6 Williams ..... CNL SE 20-4s-2w.
Gibson 3 Hoover ..... SE SW SE 20-4s-2w.
Turner 2 Ward ..... SW NW NW 28-4s-2w.

Creek County

Beal 1 well ..... SE SW SE 25-14-9.
Brauer 1-B Ary ..... C NW SW 31-16-7.
Briggs 1 Jones, wildcat ..... NE NE NW 29-16-10.
Bruin 1-A Tiger ..... SE SE SW 9-14-9.
Dunn et al 2 Anthis ..... NE NW SE 34-14-10.
Irvin 1 Bailey ..... SE NE SE 1-18-9.
Swift 3 Mussellem ..... SE SW NE 18-18-10.

Grady County

McCasland 2-B Horton ..... SW SE SE 8-3n-5w.

Jackson County

Mutual 1 Cavas, wildcat ..... CWL NW NE 36-4-21w.
Burnham 6-A Hensley ..... NE SW NW 10-1n-20w.

(Continued on Page 213)

EASTERN TEXAS FIELDS

Second Well Completed in New Chapel Hill Field

By R. MARNE SANFORD

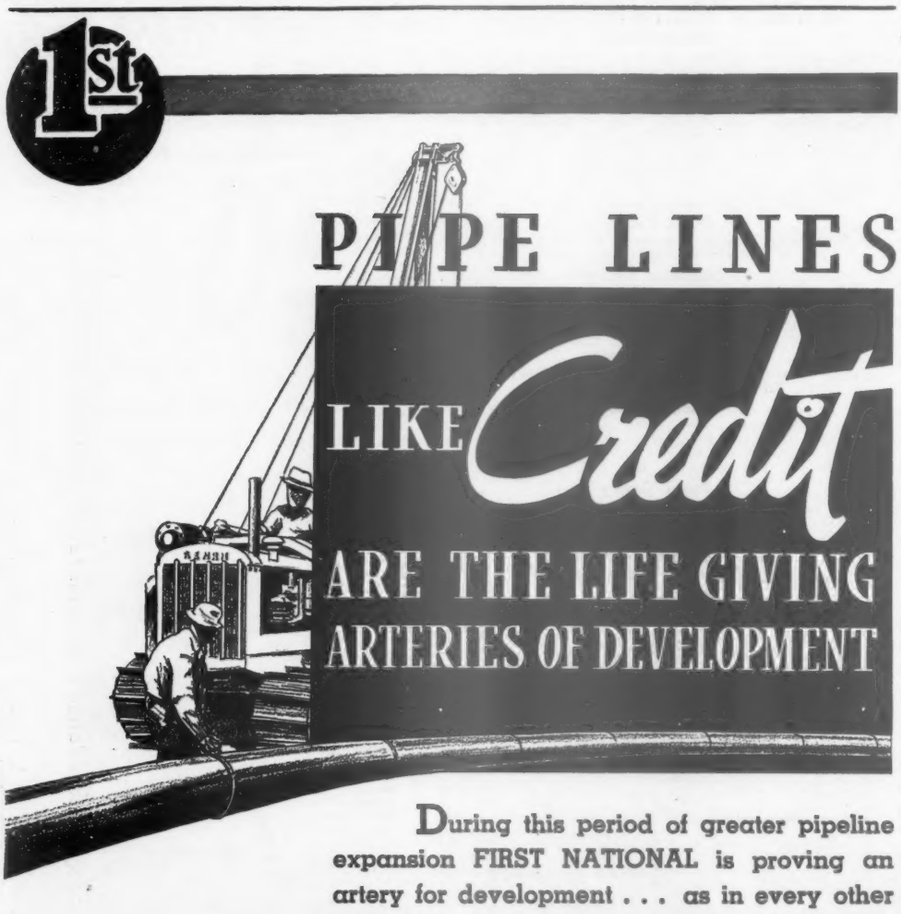
DALLAS, Tex., Sept. 16.—Locations and completions in proven fields featured the week's activity in the eastern Texas area, no new wildcat locations being reported for the 7-day period.

The East Texas field reported a total of 10 new wells completed and 8 new locations. There were four completions in the East Central Texas area, one being the greatly delayed official gage on Camp County's discovery well, Moss 1 Venters. One of the completions was a dry wildcat in Limestone County, one a recompleted well in the Chapel Hill field and the remaining completion a new oil well for the Franklin County portion of the Talco field.

The Chapel Hill completion was Shell 1 Campbell, the discovery of several months ago in the Pettit lime. The well was recompleted through perforations higher in the hole from 8,036 to 8,058 ft. for 19 bbl. of oil hourly through ⅝-in. choke. Meanwhile Sun 1 Jones, L. H. Dillard Survey, 1½ miles southeast of production in the Chapel Hill field, was testing for completion. On early tests the well flowed 4.3 bbl. of distillate an hour, together with 2,000,000 cu. ft. of gas through perforation from 8,090 to 8,112 ft., total depth being 8,179 ft. Further testing was under way at the close of the week.

A wildcat scheduled to be drilled to the 3,800-ft. Glen Rose lime was spudded during the week in Ellis County. It is W. E. Butler 1 A. M. Sims, on an 8,000-acre block and in the NE part of a 57-acre tract in Section 16, R. De La Pena Survey, about 8 miles southeast of Ferris. It was below 600 ft. at the close of the week.

In Upshur County A. C. McGahhey of Tyler has announced that work will commence in the near future toward the deepening of his 1 Turner, A. Butler Survey, wildcat test in the Coffeyville area. It has been shut down for some time at 4,211 ft. after topping dry Woodbine sand at 3,960 ft. The new contract depth is 5,000 ft. for a test of the Paluxy sand. A 122-ft. derrick is being built and the 600 ft. of 10-in. surface pipe will be recemented before deepening.



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EASTERN TEXAS COMPLETIONS

EAST TEXAS FIELD

(1-hour gages)

Gregg County

Longview area: Atlantic 82 Moore, 58 bbl., 3,510-79 ft.
Deep Rock 26 Jones, 68 bbl., 3,541-82 ft.
Marine Prod. 3 York, 80 bbl., 3,528-60 ft.
N. P. Powell 1 McKinley, 21 bbl., 3,585-94 ft.
Kilgore area: Gulf 1-SW Douglas, 60 bbl., 3,678-89 ft.
Sinclair Prairie 60 Cole, 40 bbl., 3,513-18 ft.
Sun 6 Walker, 40 bbl., 3,711-12 ft.

Rusk County

Kilgore area: Rudo Oil & Gas 5 Morse, 80 bbl., 3,591-3,625 ft.

Upshur County

Longview area: Magnolia 19 Adkins, 60 bbl., 3,678-89 ft.
Magnolia 36 fee, 60 bbl., 3,644-45 ft.

EAST CENTRAL TEXAS

(24-hour gages)

Camp County

Wildcat discovery: H. S. Moss 1 Venters, S. Wright Survey, 3 miles SE Leesburg, 152 bbl. through perf. from 8,000-42 ft.

Franklin County

Talco field: Humble 2 Young, 130 bbl., T.D. 4,290 ft.

Freestone County

Cayuga field: Stanolind 5 Cullinan, abandoned location.

Limestone County

Wildcat: J. G. Phillips 1 Reid, dry at 1,098 ft.

Smith County

Chapel Hill field: Shell 1 Campbell, recompleted through new perf. from 8,036-58 ft. for 19 bbl. hourly through ⅝-in. choke.

DRILLING REPORT

Delta County

Partin & Skinner 1 Lomar, T. Jones Survey, lost first hole, skidded 50 ft. west, spudded and shut down.

Ellis County

W. E. Butler 1 A. M. Sims, 1 mi. SW Bristol on 8,000-acre block, first report, 3,800-ft. test.

Falls County

Joy Carruth 1 Westbrook, Manchaca Sur., 4½ mi. NE of Chilton, S.D. 730 ft.

Fannin County

H. T. Fleming 1 Welch, E. J. Allen Sur., 4 mi. NW Honey Grove, S.D. 90 ft.
Damon Oil 1 A. L. Chaffin, SW cor. 85-acre tract, J. Ketcham Sur., 4 mi. NE Bonham, moving in material.

Kaufman County

T. G. Shaw, Tr. 1 Agnes Wynne, B. S. Newman Survey, 8 mi. E Kaufman, lower Trinity test, base Massive 6,255 ft., T.D. 6,454 ft., S.D.

Leon County

Alexander & Wilhite 1 C. H. Mills, M. Copeland Sur., 2½ mi. E of Normangee, drilling 4,351 ft.

Limestone County

Frank Bryan 1 F. Bevill, J. H. Murray Survey, 1 mi. SW Horn Hill, hole 7° off vertical, P.B. to 1,460 ft. and still 4° off vertical, skidded 48 ft. west, drilling new hole at 75 ft.

Navarro County

Carter 1 Bridwell, M. Shire Survey, ½ mi. N Angus, T.D. 591 ft., showing some oil.
A. J. Willis 1 Cheney, W. Reed Sur., 12 mi. SE Corsicana, S.D. 802 ft.
Willis 1 Swanson, J. Johnson Sur., S.D. 803 ft.

Red River County

J. F. Morrissey 1 Tyler, James Miro Survey, 3½ mi. SE of Bogata, 5,000-ft. test, 10-in. set at 110 ft., drilling 598 ft.

Upshur County

H. C. McGahey 1 Ludie Turner, SE cor. 200-acre tract in A. Butler Survey, top Pecan Gap 2,380 ft., base Pecan Gap 2,970 ft., S.D. 4,211 ft.

Van Zandt County

Clark 1 Hallman, R. T. Wheeler Survey, 4 mi. SE of Van, top Pecan Gap 2,555 ft., base Pecan Gap 2,775 ft., fishing 3,990 ft., top Austin chalk 3,685 ft.

Wood County

Amerada Pet. 1 J. J. Lloyd, William Barnhill Survey 7 mi. E Yantis, S.D., water 374 ft.

Tubb Ranch Ordovician Field Gets Important Extension

By R. MARNE SANFORD

MIDLAND, Tex., Sept 16.—The Ordovician producing area on the Tubb ranch in southern Crane County was given added importance this week when the second well was brought in as a half-mile northwest outpost to the new discovery of about 5 months ago.

The Ordovician producing Tubb field, immediately west of the Permian lime producing Sand Hills field, has been one of West Texas' few deep producing areas for some time. In April of the past year Gulf Oil Corp. opened a second Ellenburger lime spot on the large ranch, the new discovery being about 3 miles southeast of the Tubb field. The new producer of this week is a diagonal, two-location-northwest offset to the discovery well and offers indications to geologists that this new area may prove as important as the old one. The Ellenburger lime was topped 25 ft. higher in the new well than in Gulf's discovery.

The outpost producer is American Liberty, 10-A Tubb, SW cor. SE Section 11, Block 27, P.S.L Survey. Drilling saturation in the Ellenburger lime from 5,760 to 5,783 ft., the well flowed at a daily rate of 5,130 bbl. of oil and 2,062,000 cu. ft. of gas. At the close of the week 5½-in. casing had been cemented at 5,737 ft. with 650 sacks of cement and plug is scheduled to be drilled early in the week.

In Crockett County and as a mile south outpost to the Soma field, temporary abandonment was reported for Moore Exploration 1 Halff, Section 65, Block 1, H.&G N. Survey. The wildcat was shut down at a total depth of 1,503 ft. in anhydrite.

Moore Exploration 1 Couch, wildcat 8½ miles south and slightly east of the Soma area, was indicating a new producing area when it prepared to set 7-in. casing on top of saturation in the Yates sand. The wildcat, located in Section 52, Block G.G., W. S. Riggs Survey, topped the Yates sand at 1,063 ft. and is bottomed at 1,090 ft. The 8-in. casing stuck in the hole while being run and as the week closed 7-in. was being unloaded at the well. The extent of the show was not reported.

New Wildcats

Ector County was given two wildcat locations during the week and Pecos County was given one. In the southern part of the county and approximately 6 miles east of the Penwell field Forest Development Corp. located its 1 W. L. Bradley, 467 ft. from the south and east lines of Section 18, Block 43, Township 3s, T.&P. Survey. It is about 5 miles north of the Crane County line. Forest Development Corp. also staked Ector County's second wildcat. It is 1-H Moss, 1,980 ft. from the north and 660 ft. from the west lines of Section 48, Block 43, Township 2s, T.&P. Survey. The location is about 2½ miles southeast of the Harper field.

In northern Pecos County Landreth Production Corp., Fort Worth, staked its 1 J. A. McDonald, 467 ft. from the south and east lines of Section 37, Block 11, H.&G.N. Survey. It is about 9 miles north and slightly west of the Taylor-Link field. Contract has been let and rotary is being moved in for immediate drilling. It will go to 2,500 ft.

SOUTHERN WEST TEXAS COMPLETIONS
(24-hour gages)

Crane County

McCamey field: Continental 2-D Hughes, new potential 82 bbl., T.D. 2,565 ft., O.W.D.D.
Jordan field: Texas 5-A University, 535 bbl., 3,533-3,600 ft.

Pecos County

Taylor-Link field: Aha Oil 4-F University, 101 bbl., 1,655-70 ft.

Ector County

Johnson field: Atlantic 1-J Johnson, 1,437 bbl., 4,060-4,164 ft.
Great Western 7 Johnson, 415 bbl., 4,105-4,310 ft.
Forest Development Corp. 1-H Moss, SW NW Sec. 48. 4,031-4,210 ft.
Humble 6-B Henderson, 615 bbl., 3,935-4,200 ft.
North Cowden field: Stanolind 4-B Midland farms, 1,030 bbl., 4,390-4,615 ft.
Goldsmith field: Phillips-Pure 103 Cowden, 1,215 bbl., 4,092-4,151 ft.

Upton County

McElroy field: Gulf 8-A Crier-McElroy, 1,529 bbl., 2,655-2,881 ft.

Ward County

Hutchins field: Gulf 144 Hutchins, 147 bbl., 2,617-2,760 ft.
Gulf 146 Hutchins, 648 bbl., 2,510-2,736 ft.

DRILLING REPORT

Crane County

Gulf 1-F University, SE SE Sec 22, Blk. 31, University Sur., drilling 5,060 ft.

Ector County

Forest Development Corp. 1 Bradley, SE SE Sec. 18, Blk. 43, Twp. 3s, T &P. Sur. First report.
Forest Development Corp 1-H Moss, SW NW Sec. 48, Blk. 43, Twp. 2s, T.&P. Sur. First report.

Hudspeth County

Haymon Krupp 1 Briggs, Sec. 24, Blk. 73, Twp. 7, T.&P. Sur., 5½-in casing cemented at 6,202 ft., T.D. 6,224 ft., cementing cavings.

Crockett County

Moore Exploration and Olson Drilling 1 Couch, W. S. Piggs Sur. Top Yates sand 1,063 ft. T.D 1,090 ft., prep. set 7-in. casing.

Pecos County

Landreth Prod. 1 McDonald, SE SE Sec. 37, Blk. 11, H.&G.N. Sur. First report.
S. D. Pattillo 1 Hoffman, SE NW Sec. 6, Blk. 141, T.&St.L. Sur., 2,000-ft. test, drilling 450 ft.
Taubert, McKee & Siemoneit 1 Crockett, SW Sec. 4½ Blk. 3, H.&T.C. Sur., set casing 2,905 ft., gas 3,150 ft., drilling 3,532 ft.

Presidio County

Wilcox 1 Conring, Sec. 102, Blk. 4, H.&T.C. Sur., S.D. casing 1,038 ft.
Wilcox 2 Jones-Coffield, Sec. 38, Blk. 34, H.&T.C. Sur., P.B to 2,369 ft. from 2,399 ft., prep. P.B. again.

Sutton County

Domain 1 G. S. Allison, SW NE Sec. 91, Blk. 9, T.W.& N.G. Sur., Ellenburger lime test, S.D. 1,098 ft.

Terrell County

H. H. Sides 1 Rose, Sec. 15, Blk. 148, T.&St.L. Sur., location.

Reeves County

Roy Johnson 1 Perkins, Sec. 18, Blk. 7-C, P.S.L. Sur., drilling 1,462 ft.

Upton County

Texas Pacific 1 Eddleman, SW NE Sec. 208, Blk. F, G.C.S.D.&R.G.N.G. Sur., 6⅝-in. casing set at 2,869 ft., cleaning out after shot 2,945-3,250 ft. No gage reported.
J. F. Slaughter 1 Porter, Sec. 184, Blk. E, C.C.S.D.& R.G.N.G. Sur., location
B. H. Kean 1 Taylor, Sec. 22, Blk. 2-B, G.C.&S.F. Sur., drilling plug at 2,552 ft.

Ward County

Fitzpatrick & Slack 1 Wilson, Sec. 145, Blk. 34, H.& T.C. Sur., 1¼ mi. SE of discovery well, spudded and shut down.
Gulf 5 Wristen, Sec. 13, Blk. 5, H.&T.C. Sur., scheduled Ordovician test, top Ellenburger 9,022 ft., preparing to cut drill pipe near T.D. 9,187 ft. due to unobtainable fish at T.D.
Sinclair Prairie 1 Wirt Davis, 330 ft. NW, 2,310 ft. SW lines, Sec. 32, Blk. 4, H.&T.C. Sur., 3,500-ft. test. Broken oil shows from 2,827 to 3,190 ft., S.D. 3,300 ft.

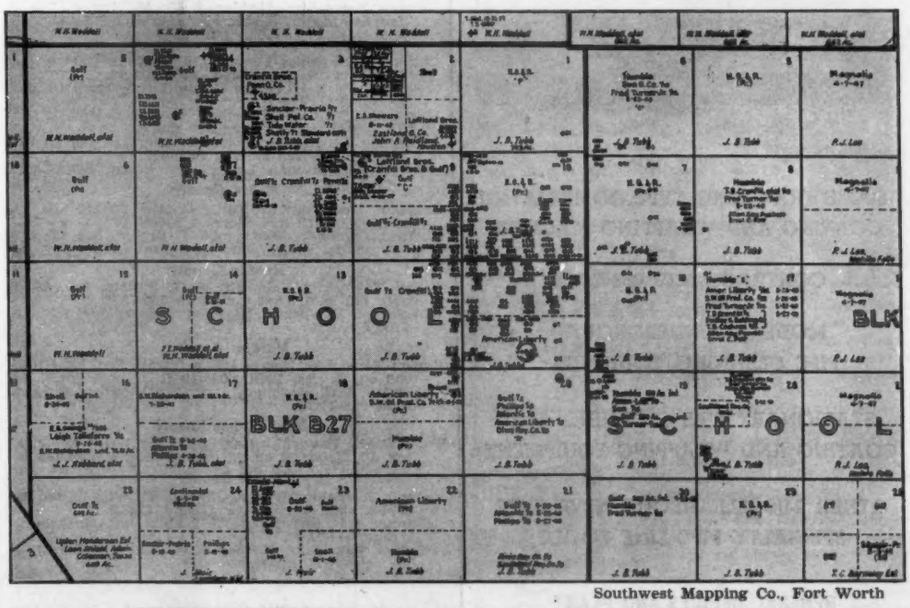
NORTHERN WEST TEXAS

Sloan & Zook and T. N. Sloan 1 Waples-Platter, wildcat test in Section 565, ¾ mile north of the Waples-Platter area which is north and east of the Bennett area in Yoakum County, reported a flowing and swabbing gage of 167 bbl. of oil in 24 hours at the close of the week. The production was cutting about 7.6 per cent basic sediment and about 4/10 of 1 per cent water. It has been acidized with 5,000 gal. at its total depth of 5,297 ft.

Offering a sizable extension to the link area between the Duggan and Slaughter areas of Hockley and Cochran counties, Magnolia 1-D Mallett, Labor 9, League 49, Edwards County School Lands, about 3 miles north of production on the west side of the Slaughter field, encountered the pay horizon at 4,955 ft. and drilled to a total depth of 4,990 ft. As the week closed operators were preparing to acidize with 1,500 gal. This is the second major spread Magnolia Petroleum Co. has offered for the link area, its 1 Woodley, League 57, Oldom County School Lands, having reported a gage of 15 bbl. of oil hourly to assure production. The 1 Woodley is bottomed at 4,985 ft. with its pay section topped at 4,930 ft .

Possibilities of a greater market for oil from the Slaughter and Duggan areas were seen when Motor Fuels Corp.'s refinery at Levelland, about 10 miles

(Continued on Page 222)



Southwest Mapping Co., Fort Worth

The second deep Ordovician oil field on the Tubb ranch in Crane County, discovered in April by Gulf Oil Corp., was given a new producer to greatly advance the possibilities of developing another area similar to the Tubb field about 3 miles to the northwest. The new well is American Liberty Oil 10-A Tubb, center of south part of Section 11, Block 27-B, P.S.L. Survey. The Permian lime production between the two deep fields is the Sand Hills field

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SPEED

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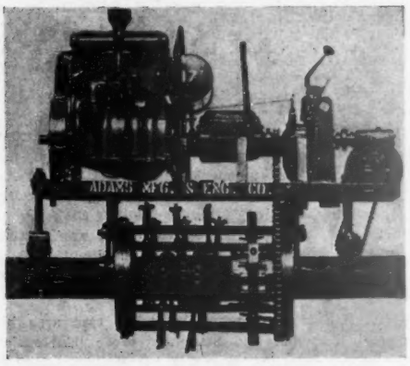
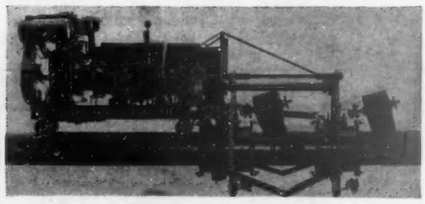
IT'S AN ADAMS



2" TO 16"
ADAMS TRAVELING TYPE
ROTARY PIPE CLEANING MACHINE

Cleans Pipe In the Trench Or On Top Of The Ground

IT'S AN ADAMS



2" TO 16"
ADAMS TRAVELING TYPE COMBINATION COATING AND WRAPPING MACHINE

CONTRACT AND RENTALS

MODERN, UNDERGROUND PIPE CLEANING EQUIPMENT

STATIONARY PIPE CLEANING AND COATING AND WRAPPING EQUIPMENT

OTHER MISCELLANEOUS NEW TYPE SPECIALTY PIPE LINE TOOLS

GENERAL OFFICES AND PLANT
ADAMS MFG. & ENGINEERING CO.
2068 BELGRAVE AVE.
HUNTINGTON PARK, CALIFORNIA

Ohio's Second Largest Gas Well Found in Athens County

By STAFF CORRESPONDENT

ATHENS, Ohio, Sept. 16.—A 35,000,000-cu. ft. gasser was struck 5½ miles east of the town of Athens in Athens County. The gas pay was struck in the second Cow Run sand at a depth of 535 ft. The well is owned by Tooley & Wallace and is located in the center of Canaan Township on the A. P. Linscott farm in the SE NE Section 16. The top of the second Cow Run sand was found at 520 ft. with the gas pay encountered at 15 ft. in the sand when drilling was stopped. The well blew open 21 hours before it was tubed and shut in with no appreciable decline in open flow. This is the second largest gas well drilled in Ohio, the largest gaging 54,000,000 cu. ft. open flow in the Cambridge Oriskany field in 1924. Completions in the Ohio field number 11 gas wells, 7 dry holes, and 9 oil wells. Newark field reports fair gas wells while Muskingum County yields a 5,000,000-cu. ft. gasser.

Ashland County

Mifflin Township: Fierbaugh 1 H. Seiss, Sec. 1, dry, Berea, T.D. 734 ft.

Coshocton County

Tiverton Township: Ohio Fuel 1 C. Humphreys, Sec. 9, 600,000 cu. ft. gas, Clinton 3,344-60 ft.

Fairfield County

Pleasant Township: Lancaster City 2 Keister, Sec. 8, dry, Clinton, T.D. 2,215 ft.

Gallia County

Addison Township: Ohio Fuel 1 Roush, Sec. 23, 90,000 cu. ft. gas, second Berea 1,577-95 ft.

Guernsey County

Cambridge Township: Ronshausen 1 Nyce, Lot 25, 4 bbl., 30,000 cu. ft. gas, shot, Berea 1,046-79 ft.

Hocking County

Green Township: Griffin 3 Nutter, Sec. 24, dry, Clinton 2,869-93 ft., T.D. 2,916 ft.
Ward Township: Preston Oil 183 Sunday Creek Coal Co., Sec. 12, 22 bbl., Clinton 3,509-43 ft., T.D. 3,551 ft.

Newark Field—Licking County

Mary Ann Township: Ohio Fuel 1 Roy Nesbitt, 3,460,000 cu. ft. gas, Clinton 2,581-2,616 ft.
Newark Township: James McCloy 1 Charles Swank, on western edge of Newark Corporation, 1,120,000 cu. ft. gas, Clinton 2,354-82 ft.
S. D. McCloy 1 M. Owens, Lot 2, Brice and Stanberry Lots, second quarter, 720,000 cu. ft. gas, Clinton 2,315-41 ft.
Newton Township: Shrider 4 K. McKinney, Lot 8, fourth quarter, 3 bbl., shot, Berea 503-12 ft.

Medina County

Chatham Township: Preston Oil 1 Glenn Garver, Lot 14, Tract 16, dry, Berea, T.D. 400 ft.
Sloan & Zook 1 Charles Doane, Lot 3, Tract 16, dry, Berea, T.D. 416 ft.
Harrisville Township: Pearsol 1 R. Vandemark, Lot 37, 5 bbl., shot, Berea 380-426 ft.
Belmont Quadrangle 1 H. McClain, Lot 36, 10 bbl. (est.), Berea 298-385 ft., T.D. 412 ft.
Edson 1 C. Billman, Lot 61, dry, Berea, T.D. 574 ft.

Meigs County

Lebanon Township: Proffitt 1 Charles Smith, Sec. 21, 125,000 cu. ft. gas, Berea 1,868-74 ft.
Rutland Township: Bowman 3 J. Brown, Sec. 20, 50,000 cu. ft. gas, second Cow Run 572-86 ft.

Monroe County

Bethel Township: Luburgh 25 H. Swartz, Sec. 10, 6 bbl., not shot, first Cow Run 560-78 ft.
Washington Township: Harris 2 Spence, dry, Keener, T.D. 1,370 ft.

Morgan County

Marion Township: Harris 4 Eva Harris, Sec. 13, 1,100,000 cu. ft. gas, Brill 1,003-10 ft.
Crowley 2 E. Bowman, Lot 7, 250,000 cu. ft. gas, Brill 928-55 ft.

Muskingum County

Brush Creek Township: Gas Producing 1 Gill Milligan, Sec. 15, 5,200,000 cu. ft. gas, Clinton 4,175-4,205 ft.

Noble County

Jackson Township: Wilson Oil 8 L. C. Wilson, Sec. 2, 3 bbl., shot, Macksburg 5 sand 723-35 ft.
Skinner 4 P. Brown, Sec. 3, 2 bbl., shot, Macksburg 8 sand 944-75 ft.
Jefferson Township: Harper 1 D. Walters, Sec. 8, 4 bbl., stray 715-20 ft.

EASTERN KENTUCKY

ASHLAND, Ky., Sept. 16.—There was considerable talk of deep-test drilling in the eastern Kentucky fields in recent months but nothing productive has been reported. Some few wells have passed the 3,500-ft. mark in this area but actual deep-well activities have not been carried out.

An extensive leasing campaign several months ago seemed to point to deep tests, especially as acreage was leased on which abandoned shallow wells were located. However, only scattered operations resulted at the time with none of the wells going much deeper than usual.

Reports received today indicate that one concern is planning deep-well tests in one Kentucky county. Usually reliable sources said the Stanolind Oil & Gas Co. is making preparations for deep drilling on the Stinking Creek dome in Laurel County. While this area is not in the immediate Ashland section, all eastern Kentucky operators will keep an attentive eye on the Laurel County operations.

Knott County

Kentucky-West Virginia Gas So. 1 Lindsey Martin, 94,000 cu. ft. gas in Big lime and 245,000 cu. ft. in shale, R.P. 340 lb., T.D. 2,451 ft.

Floyd County

Kentucky-West Virginia Gas Co. 1 S. P. Davidson, on Calf Branch, 2,398,000 cu. ft. gas, R.P. 154 lb., 12-hr. test, lime, T.D. 1,359 ft.

Morgan County

Owens, Libby-Owens 1 J. H. Wilson, on Grassy Creek, 50,000 cu. ft. gas, Corniferous. Due to a typographical error the well was reported as an oil well last week.

WESTERN KENTUCKY

OWENSBORO, Ky., Sept. 16.—Six oil wells and 11 dry holes were completed in western Kentucky during the past week. The Hebbardsville pool was limited on the east side as two dry holes were drilled, one being a southeast offset to the discovery well. Hupp 1 Otto Busby to the west of the discovery well, Connell 1 Otto Busby, was testing with 1,400 ft. of oil in the hole from the second Jett sand at 1,522-34½ ft.

Butler County

Silver City district: Billy Phillips 1 Myrtle Brown, dry, through Jones, T.D. 522 ft.
Huntsville district: Cumberland 2 George Sweeze, 5 bbl., Jones sand, T.D. 448 ft.

Daviess County

Handyville district: Stewart & Snyder 6 Anna Ezell, 10 bbl. per hr., 160-qt. shot, Jett 1,256-93 ft.
Stewart & Snyder 5 Anna Ezell, testing, 80-qt. shot, Jett 1,260-80 ft., 80-qt. Jones sand 1,402-24 ft., 60-qt. Jackson 1,502-23 ft., 40-qt., Bethel 1,624-31 ft.
Hupp & Cameron 4 Lula Akin, drilling at 621 ft.
Hupp & Cameron 5 Lula Akin, spudding in.
Teller 1 B. E. Conner, drilling deeper, old T.D. 1,257 ft., going to McClosky.
Master 10 E. W. Richmond, spudding in.
Ohio 6 Steve Cooms, drilling at 400 ft.
Utica district: Ellis 4 Ellis, dry hole through McClosky, T.D. 1,737 ft.
Baldwin 5 A. A. Westerfield, 260 bbl., 120-qt. shot, Jett 1,148-69 ft., 80-qt., Bethel 1,471-86 ft.
Ellis 1 Cravens, 12 acres, location.
Farmer 6 Frank Nation, drilling at 150 ft.
Schaffer 1 Millie Neeley, 10 acres (Hupp farmout), moving in.
Daugherty 10 Rex O'Flynn, drilling at 1,200 ft.
Creek Drilling Co. 3 Tom O'Flynn, drilling at 300 ft.
Baldwin 4 A. A. Westerfield, drilling deeper from Jett, old T.D. 1,157 ft.

Hancock County

Saunders School district: Walter Richards 2 Leslie Boling, dry through Jett, T.D. 445 ft.
Flesher 4 W. F. Burk, dry through Jett, T.D. 353 ft.
Easton district: O. D. Vickers et al 3 L. S. Fuqua, dry through Jett, T.D. 411 ft.
Flesher 4 Font Richards, spudding in.

Henderson County

Hebbardsville district: Snowden & McSweenev 1 Corrine Bennett, dry through Jett, T.D. 1,568 ft.
Basin Drilling Co. 1 Joe Walden, dry through McClosky, T.D. 2,194 ft.
Cameron 1 Sally Barnes, dry through Jett, T.D. 1,595 ft.
Hupp et al 1 Otto Busby (King-Pruitt-Min.), testing, 1,400 ft. oil in hole, second Jett 1,522-34½ ft.
O. J. Connell et al 2 Otto Busby, moving in.
Hupp & McCummings 1 Otto Busby, 50 acres, rigging up rotary.

McLean County

Nuckols district: Barrett Hill Dev. Co. 3 L. C. Atherton, 5 bbl., 1,250 gal. acid, McCloskv 1,209-30 ft., no response, drilled deeper from 1,051 ft.
Barrett Hill Dev. Co. 9 L. C. Atherton, dry through Jett, T.D. 750 ft.

(Continued on Page 214)

COMPLETE LINES OF PIPE LINE EQUIPMENT

DISTRIBUTORS FOR

CARDWELL PIPE BOOMS
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MURRAY RUBBER COMPANY

606-8 N. Milby Preston 7017

HOUSTON, TEXAS

Oklahoma Fields

(Continued from Page 209)

Kay County

National Union 1 Long, old well drilled deeper.... NW NW NW 29-28-1e.

Marshall County

Pure 1-106 Little.....SW SW SW 27-5s-7e.

Oklahoma County

I.T.I.O. 13 Olds.....NE NE NW 24-11-3w.

Pontotoc County

Cowley 1 White, wildcat.....NE NE NW 29-4-6.
Morrison 1 Kroeger.....SE SW NE 25-5-6.

Pottawatomie County

Amerada 1 Harrison, old well drilled deeper.... NW NW SW 33-7-4.
Transwestern 3 Latimer, old well drilled deeper.... SW SW NW 16-7-4.
Patterson 1 Nichols.....SE NW SE 28-6-5.
Smith 1 Bray.....SW NW NW 5-7-4.
Vise 4 Richardson.....NW SE SW 16-7-4.

Seminole County

Newsom 1-A Choya.....NW SW NW 21-7-6.

Stephens County

Grimes 1 Baker, wildcat.....SE NW NW 35-2s-6w.
Hawks 5 Simpson.....SW SE NE 11-1n-5w.

WILDCAT DRILLING REPORT

Atoka County

Kirksey 1 Baskett.....SW SE SE 7-3s-10e
Sandy lime 900-10 ft., T.D., show oil, S.D.

Caddo County

Texas 1 Smith.....NE NW 2-5-12w
T.D. 3,424 ft., drilling 2,790 ft. in new hole in Viola topped at 2,543 ft.
Ray Stephens, Inc. 1 Lankford.....SE SE NW 6-6-9w
Rigging up rotary for 8,000-ft. test.

Creek County

Shell 1 Lynihan.....NE SE NE 31-15-7
Drilling 2,040 ft.

Garvin County

Stanley Thompson 1 Alliance.....SW SE SW 22-4-2e
T.D. 2,965 ft., rigging up to deepen.

Hughes County

Don Feagin et al 1 Nix.....NE NW SW 8-9-11
Set 15-in. 22 ft., drilling below 250 ft.

Jackson County

Gene R. Burke 1 Estes.....SW SW NE 34-3n-19w
Drilling below 600 ft.
Mutual Oil 1 Cones.....36-4n-21w
First report. Drilling below 115 ft.

Kay County

Earl Williams 1 Trueblood.....SE SE 25-25-1w
Drilling below 830 ft.
Zephyr Drilling 1 State.....NE NW SW 13-26-2w
Tonkawa 2,738 ft. Layton 3,130 ft., Big lime 3,358 ft., drilling 3,380 ft.
Armer & Wilson 1 Deimar.....NE NW SW 28-27-1w
Set 8-in. 2,040 ft., drilling below 2,220 ft.
Fred Elders 1 Voehl.....SE SE NW 34-27-2w
Lime 1,160 ft., 6-in. 1,170 ft., drilling below 1,190 ft.

Kiowa County

Southwestern Oklahoma O. & G. 2 Foltz.... NW SE SE 10-6-18w
Drilling below 1,860 ft.
Artie Baker 1 Coakley.....NW NE SE 30-7-17w
First report. Machine.

Lincoln County

Wilcox O. & G. 1 Murphy.....NE SE SW 7-14-6
Prue 3,208 ft., T.D. 3,268 ft., pumped 5 bbl. oil per day, testing.

Love County

Colvin & Hicks 2 Westheimer-Daube.... W½ SE SW 27-6s-2e
Water sand 893-95 ft., drilling below 940 ft.

Okfuskee County

W. O. Carter 1 Bucco.....NE NE SE 20-10-12
Drilling below 150 ft.
W. B. Pine 1 Armstrong.....SE SE NE 3-11-10
Gilcrease 2,970 ft., Dutcher 3,122 ft., Wapanucka 3,162 ft., Cromwell 3,260 ft., rigging up standard tools.
W. L. Graham et al 1 McLain.....SE SW SW 7-12-7
Prue 2,949 ft., T.D. 2,960 ft., 7-in. 2,941 ft., waiting on cement.
J. O. Haynes Drlg. et al 1 McKernan.... E½ SE NW 25-12-8
Cromwell 3,353 ft., Pitkin 3,550 ft., drilling below 3,775 ft.

Osage County

Peters & Norbla 15 Osage.....SE NW SW 16-22-9
Bartlesville 2,138-2,265 ft., show gas at 2,145 ft., running 8-in.

Payne County

Wood Oil and Link Oil 1 Krolop.....SW SE 14-17-5
Drilling below 2,950 ft.
H. & H. Oil 1 Linsemeyer.....SE SE SW 3-18-4
Dewey 2,145 ft., drilling below 3,960 ft.

Pontotoc County

Crescent Oil 2 Thompson.....NE NW SW 29-3-4
Drilling below 1,605 ft.
J. R. Crowley and C. R. Smiddy 1 White.... NE NE NW 29-4-6
First report. Rigging up rotary.

Seminole County

Mid-Continent 1 Porter.....NW SW NW 12-7-7
Viola 4,470 ft., T.D. 4,485 ft., shot stuck drill pipe off at 4,244 ft., to whipstock.
J. T. Miller et al 1 Buckner.....SE SE NE 20-10-8
Booch 3,194 ft., drilling below 3,335 ft.

Stephens County

Grimes & Vaughn 1-A Baker.....SE NW NW 35-2s-6w
First report. Spudded with rotary.
Brown et al 1 Dilly.....SE SE 6-3s-5w
Spudded.

Tillman County

Cline et al 1 Staley.....SE SE NW 10-2s-19w
Drilling below 6,500 ft.

Here's the Reason

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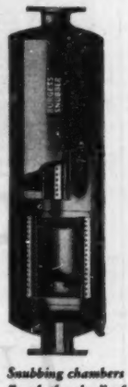
There's no exhaust noise from this pumping engine. The noise is prevented—not muffled—by a Burgess SDHC Exhaust Snubber.

Pumping units equipped with Burgess Snubbers are always quiet. They can be operated near residences—day and night—without noise disturbance. These snubbers do not merely subdue exhaust noise like old style mufflers. They prevent it by *snubbing* the slugs of high velocity exhaust gases. These gases are then passed on smoothly to the atmosphere.

Burgess Snubbers can be used with any type engine. They require no tuning. They are built to prevent resonance at pipe frequency. Hence, there is no exhaust roar. For quiet operation, use a Burgess Snubber on every pumping engine. Mail coupon for catalog.



Snubbing chambers "snub the slug" of high velocity exhaust gases and prevent noise.

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Please send Snubber Data Book giving information on how to prevent Diesel exhaust noise and get higher engine efficiency.

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*Company*_____

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*City*_____ *State*_____

Price et al 1 Crow.....NW NW NE 24-2s-15w T.D. 630 ft., S.D. for repairs.

Woods County

Gulf 1 Grace Hess.....NE NW 33-23-13w Cellar and pits.

Louisiana Gulf Coast

(Continued from Page 207)

Ascension Parish

Darrow dome: Humble 4-B Community, dry, T.D. 9,788 ft., salt.

Beauregard Parish

Neale field: Atlantic 1 Kay unit, 271 bbl., ¼-in. choke, perf. casing 8,365-80 ft., T.D. 8,447 ft.

Evangeline Parish

Ville Platte field: Continental 9 Fontenot, 411 bbl., ⅞-in. choke, T.D. 9,045 ft.
Continental 3 Vidrene, 293 bbl., ⅞-in. choke, T.D. 10,181 ft.
Danciger 1 Hirsch, 725 bbl., ¼-in. choke, perf. casing 10,125-45 ft., T.D. 10,192 ft.

Iberia Parish

New Iberia field: Lisbon Iberia 10 Gulf fee, 150 bbl., ¼-in. choke, perf. casing 3,802-30 ft.
Midstates 1 J. E. Schwing, top salt 8,954 ft., dry, T.D. 8,960 ft.
Bayou Pigeon field: Plymouth 1 LeBlanc, 576 bbl., ¼-in. choke, perf. casing 8,054-68 ft., T.D. 8,076 ft.

Jefferson Parish

Barataria field: California Co. 2-B Community, 316 bbl., 5/32-in. choke, top sand 8,759 ft., T.D. 8,773 ft.

Jefferson Davis Parish

Woodlawn field: Union Sulphur 6 Calcasieu National Bank, 235 bbl., ¼-in. choke, perf. casing 9,480-85 ft., T.D. 9,755 ft.
Union Sulphur 4 Johnson, 282 bbl., ⅛-in. choke, perf. casing 8,090-96 ft., T.D. 8,118 ft.

La Fourche Parish

Golden Meadow field: Brown-Wood 2 LeFont, 192 bb'.. ⅛-in. choke, perf. casing 5,162-74 ft., T.D. 5,220 ft.
Jim McMurray 2 Collins, 144 bbl., 12/64-in. choke. perf. casing 5,430-40 ft., T.D. 5,500 ft.
Leesville field: Texas 74 Leesville, 206 bbl., ⅛-in. choke, perf. casing 8,145-8,210 ft., T.D. 8,787 ft.

Plaquemines Parish

Grand Bay field: Gulf 10-A Grand Prairie Levee, 779 bbl., ¼-in. choke, perf. casing 8,738-68 ft., T.D. 8,787 ft.

St. Mary Parish

West Cote Blanche field: Texas 4 State, 243 bbl., 13/64-in. choke, perf. casing 4,948-5,012 ft., T.D. 5,015 ft.
Charenton field: St. Mary 7 Blanchard, 80 bbl. fluid, 50 per cent salt water, pumping, top sand 1,142 ft., T.D. 1,152 ft.

St. Martin Parish

Anse La Butte field: O. W. Dyer 1 Guedry, dry, T.D. 3,795 ft.

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Universal Mud Gun

Double balanced flow gives this Super Universal Type of Mud Gun easy operation regardless of pressure. One man can swing it to and fro, up or down, or it can be locked in one position. The double flow eliminates the hydraulic reaction that causes the ordinary gun to spin. Durable rubber nozzle available. These guns are used by the largest operators. See Composite Catalog.

Patterson-Ballagh Drill Pipe and Casing Protectors enable your crew to operate at top speed. Equip every string.

PATTERSON-BALLAGH CORPORATION

Los Angeles • Houston • New York

Bayou Bouillon field: Superior 2 Rycade, dry, T.D. 3,192 ft.

Terrebonne Parish

Gibson field: Shell 4 Kuntze, 392 bbl., 10/64-in. choke, perf. casing 9,504-12 ft., T.D. 9,513 ft.

Iberville Parish

White Castle field: Shell 17 Wilbert, 402 bbl., ¼-in. choke, T.D. 6,600 ft., P.B., T.D. 6,376 ft.

LOUISIANA GULF COAST DRILLING REPORT

Calcasieu Parish

W. T. Burton 1 Mayo Realty Co., South Lake Charles prospect, T.D. 11,847 ft., plugging back to sidetrack.

Cameron Parish

Superior 3 State, Calcasieu Lake dome, drilling shale 12,629 ft.
Superior 4 Vincent, West Hackberry dome, drilling shale 5,525 ft.

Iberia Parish

Sun 2 Planters Lumber Co., Fausse Point field, drilling sand and shale 4,910 ft.
Texas 6 Jefferson Island Salt Mining Co., Jefferson Island field, T.D. 8,075 ft., waiting on cement.
Texas 4-B Vermilion Bay, Vermilion Bay field, drilling shale 10,315 ft.

Iberville Parish

Superior 4 Schwing, Bayou Blue field, drilling shale 5,449 ft.

Jefferson Parish

Shell 1 State, Bayou des Illettes, 27-20s-24e, drilling shale 10,989 ft.

Jefferson Davis Parish

Continental 3 Calcasieu National Bank, drilling shale 8,712 ft.

La Fourche Parish

Sun 9 Dibert-Stark & Brown, Chacahoula field, drilling shale and lime 5,672 ft.
Tide Water 2 Delta Farms, SW of Delta Farms field discovery well, drilling sand and shale 11,480 ft.
Fohs 12 State, Lake Long field, perf. casing 9,343-46 ft., flowed est. 80 bbl. of 43-gravity oil, killed to recomplete.
Amerada 1 Moore, Raceland field, drilling shale 8,276 ft.

Livingston Parish

Humble 2 Great Southern Lumber Co., 21-7s-4e, drilling shale 2,410 ft.

Orleans Parish

W. T. Burton 3 State-Lake Catherine, drilling shale 8,640 ft.

Plaquemines Parish

Gulf 1 State, Black Bay prospect, drilling sandy shale 7,525 ft.

St. James Parish

Shell 1 Federal Land Bank, La Pice field, drilling sand 8,599 ft.

St. John the Baptist Parish

Pan American 2 Mill, La Place field, drilling sandy shale 4,674 ft.

St. Landry Parish

Joe Graham 1 Sibille, 15-8s-3e, drilling shale 1,070 ft.

St. Martin Parish

Superior 1 E. C. Stuart, 29-9s-7e, first report, location.
Superior 1 Iowa-Martin, Bayou Bouillon field, drilling shale 7,367 ft.

St. Mary Parish

E. G. Bateman 1 W. P. Foster, 38-15s-9e, drilling shale 6,790 ft.
Sun 1 Bell Isle Corp., Bell Isle dome, drilling sandy shale 6,700 ft.

Terrebonne Parish

Stanolind 1 State, Bay Junop dome, T.D. 11,002 ft., plugging back to sidetrack.
Texas 5 State, Coon Point prospect, drilling shale 8,976 ft.

Vermilion Parish

Humble 1 School Board, Erath field, coring shale 11,372 ft.

Missouri Operations

(Continued from Page 205)

C SW NE 31-55-28w, with output of 9,000,000 cu. ft. of gas. H. L. Scott of Fort Smith, Ark., made location for 1 Stonum, C NE NE 25-55n-29w, Caldwell County, and was to start work this week.

Ben I. Hall 1 Pryor, CWL E½ SE SW 35-52n-32w, Liberty area, Clay County, had Peru sand at 431-44 ft., T.D. 447 ft., and gaged 160,000 cu. ft. gas, with 105 lb. rock pressure.

In Platte County Earl Davis 1 Lampe, SE NW 12-51n-34w, gaged 1,500,000 cu. ft. of gas in Warrensburg sand at 491-505 ft.

Western Kentucky

(Continued from Page 212)

Livermore district: Ellis 1 Lula Edmonds, 28 bbl., natural, McCloskey 1,635-43 ft., to acidize, drilled deeper from Bethel, old T.D. 1,446 ft.

Ohio County

Sunnydale district: J. W. Tuttle et al 9 Lena Berry, dry through upper Pennsylvanian, T.D. 215 ft.
Tuttle et al 10 Lena Berry, drilling 100 ft.
Heflin district: Farmer 6 Fred Johnson, dry through McClosky, T.D. 1,250 ft.
Pattyville School district: Ogle et al 6 Floyd Walker, 10 bbl., 20-qt. shot, Jett 240-55 ft.
Murphy et al 4 Daniel Carden, drilling at 75 ft.
W. H. Parks et al 3 Arthur Dalton, drilling 100 ft.
United Petroleum Co. 1 A. I. Miller, drilling at 290 ft. in Jett sand.

By T. R. INGRAM

Big Gasser Extends Muskrat Field; Bowdoin Active

DENVER, Colo., Sept. 16.—The Rocky Mountain area shows substantial increase in the number of completions and new operations. Wyoming had seven oil wells, one gas well and two dry holes. In Montana, there were five oil wells, three gas wells and one dry hole.

Although down on the structure, Sinclair-Wyoming 2-A Muskrat, NW SE SW 34-34n-92w, proved to be a good well, making 10,000,000 cu. ft. of gas, and extended the field nearly ½ mile in the Frontier sand.

In Sweetwater County, Sinclair-Wyoming 75-A, the discovery well in the Tensleep at Lost Soldier which has been on production for nearly 10 years, is drilling deeper to test the lower part of the Tensleep. The lower Tensleep has proved to be a heavy producer at Wertz.

The Bowdoin gas field is getting a more intensive play as Montana-Dakota Utilities completed two gas wells and started nine others. Other new operations include one for the Raven Oil & Refining Co. at Rangely, in Colorado; one for the Continental Oil Co. in the Frannie field in Wyoming, one each for the Texas Co. and North La Barge Oil Co. in the La Barge district and one in the Osage field for the Triangle Oil Co. Montana new operations included one for the Dakota-Montana Utilities at Cedar Creek and one for the Texas Co. in Cut Bank, a wildcat in Liberty County.

COLORADO

Garfield County

Joe T. Juhan 1 Clough ..... NW SE 22-6s-94w
Drilling 84 ft., cemented 20 ft. of 24-in.

Huerfano County

Ira E. Miller 1 Hamilton ..... SE SE NW 20-29s-67w
T.D. 1,606 ft., cleaning out. (Deep test east of La Veta.)

La Plata County

Nick Spatter 1-X Bryce ..... SW SW 31-33n-9w
Drilling 4,040 ft., show of gas.

Logan County

West Plains 1 Sheldon ..... SE NW SW 3-10n-55w
Drilling below 2,000 ft. after shutting off water with 10¾-in. at 1,736 ft.

Moffat County

Steamboat Springs Synd. 1 Sutton NE NE SW 1-5n-96w
S.D. 2,270 ft.
Texas 2 Wick ..... Lot 9, 10-4n-91w
S.I. at 4,555 ft.
Mountain Fuel Supply 6-B Wilson NW SE 14-12n-100w
Coring at 2,137 ft., cored gas sand at 1,795-1,805 ft.

Ouray County

Ridgway Petroleum 1 Bennett ..... NE SE 2-45n-8w
Drilling 550 ft. in Benton shale.

Rio Blanco County

Raven Oil & Refining 30 Government, SE NW NE 31-2n-102w, Rangely field, is shut down indefinitely at 1,280 ft. with tools in the hole.

Raven O. & R. 31 Government .. SW NW NE 31-2n-102w
Rigging up. First report.
Buford Oil 1 Government ..... SW SW 16-1n-91w
T.D. 4,160 ft., landed 6¼-in. at 4,110 ft., cleaning out.
Texas-California 4 Unit ..... NW NW NW 2-2n-94w
Drilling 5,824 ft.

Routt County

Craig-Moore 1-X Irwin ..... SW NE 33-7n-85w
Drilling in red beds 2,410 ft.
Mid-Colorado Pet. 1 Omholt ..... NE NE SE 29-4n-87w
Resumed at 3,150 ft. in Morrison. (Fish Creek.)

WYOMING

Big Horn County

Frank S. Scott 1 Robertson, SE SE SE 6-54n-93w, Crystal Creek district, was plugged at 897 ft. in the Tensleep. It had the top at 863 ft.

N B. Ketchersid 1 Mann .. SW cor. Lot 42-J, 11-55n-97w
Building rig.
Prescott & Mileski 1 Government 1-51n-93w
Drilling 1,360 ft.

Carbon County

Frank M. Johnston 1 Government, SE SE 22-24n-88w, is suspended at 928 ft.

Producers Oil 1 Lake Valley ..... CNL 14-20n-88w
T.D. 3,752 ft., changing over from cable tools to rotary.

Converse County

U. & I. Oil Synd. 1 Beaver ..... SE NW 29-35n-68w
T.D. 1,000 ft., underreaming pipe to bottom.

Crook County

Vickers-Continental 1 Duncan-Lobban ..... NE NW SW 28-57n-64w
Drilling 1,500 ft., top Minnelusa 1,480 ft., 800 ft. water in hole.

Fremont County

Sinclair-Wyoming 2-A Muskrat, NW SE SW 34-34n-92w, a downstructure test on northwest flank of the Muskrat gas field, proved to be a good well in the Frontier after plugging back from the Sundance at 5,838 ft., total depth. It marks an extension of nearly half a mile in the Frontier. The Frontier was perforated at 4,170-90 ft. and it was completed for 10,000,000 cu. ft. of gas through the tubing with a pressure of 1,155 lb. Estimated open-flow capacity is 45,000,000 cu. ft. It is west of 1 Muskrat, drilled in 1928 by the old Producers & Refiners Corp., and completed at 4,340 ft. for 75,000,000 cu. ft. with 1,300 lb. rock pressure, and three-fourths of a mile east and a little north of 2-B Muskrat, completed in the Lakota in 1938 for 40,000,000 cu. ft. Last named is on a separate dome.

Pilot 6 Antone Enos, SE SE NE 21-3n-1w, in the old Pilot Butte field, was completed at 1,205 ft. in sandy shale for 30 bbl.

Hot Springs County

J. W. Bales 1 Government ..... CWL NW SE 21-42n-90w
Drilling at 850 ft. after shutting off water in Muddy sand at 702-20 ft.

Lincoln County

Ella B. Newton 1 Howard 18-25n-113w
Drilling 300 ft., contract depth 2,000 ft. South flank of La Barge field.
H. C. Harris 1 Government ... SE NW NW 23-21n-117w
Drilling 3,190 ft. in lime.
Fontenelle Dev. 1 Pomroy ..... NE SW 5-24n-113w
S.D. 1,410 ft.
Robert Miller Taylor 1 State .... NE cor. 36-25½-115w
Drilling 2,053 ft.

Natrona County

General Petroleum 7-21-G, NE NE NE 21-35n-77w, Cole Creek, made 165 bbl. on the pump at 4,598 ft., total depth, from the Shannon sand at 4,555-98 ft. Location is a mile east of No. 1-21-G, the discovery well in the Shannon, and a little more than half a mile northeast of No. 55-21-G, the discovery well in the Lakota which recently was plugged back and recompleted in the Shannon sand.

Iron Creek 7 Government, SW NW 11-32n-82w, Iron Creek district, was completed at 840 ft. for 6 bbl. of oil and 25 bbl. of water a day.

Connelly Drilling 1 State ..... SW SW NW 36-36n-81w
T.D. 1,521 ft., drilling plug to test show gas.
General Petroleum 5-16-S .... NW NW SW 16-35n-77w
Moving in.
Royalty Oil 1 Midert ..... SW SW SW 26-35n-80w
T.D. 1,555 ft., installing steel standard rig preparatory to underreaming 8-in. at 1,131 ft. to go to Wall Creek if necessary.
Lewis Gebhart 1 Government .. NW NE SE 10-39n-78w
Drilling 1,742 ft.
General Pet. 7-22-P ..... NW SW SW 22-35n-77w
T.D. 4,257 ft., cemented 8⅝-in. on bottom.

Park County

Continental Oil has released location for its 4 Northern Pacific-1 in the Frannie field, a diagonal offset on the southwest to V. M. Kirk 3 Government, recently completed for 350 bbl. Continental has a near completion in its No. 1 Prigge, across the line and carried under Carbon County, Montana.

Continental 4 Northern Pacific-1 .. SE NE SE 23-58n-98w
Rigging up rotary. First report.
Resolute 2 State ..... SW SW 16-57n-101w
T.D. 10,121 ft., Dakota at 9,725-35 ft., gas; Lakota at 10,010-40 ft., cemented 5-in. liner at 10,005 ft.

Niobrara County

Lance Creek had two completions, both inside wells. Argo 14-A Elliott, SE NW NW 5-35n-65w, was completed at 5,450 ft., total depth, for 110 bbl. an hour after acidizing with a total of 3,000 gal. Top of the Leo formation was at 4,975 ft. and top of second bench of the Leo sand was at 5,138 ft. The 7-in. was cemented at 5,361 ft. and perforated with 60 holes at 5,264-80 ft.

Ohio 16 Carrie Putnam, SW SW NW 4-35n-65w, was completed for 264 bbl. on the pump through perforations in the 7-in. at 5,400-5,380 ft. It was drilled to 5,529 ft. and plugged back after encountering water.

Ohio 9 State ..... NW SW NW 36-36n-65w
Spudded and set 10¾-in. at 140 ft.
Argo 15-A Elliott ..... SE NE NE 6-35n-65w
Location.
Argo 9 Ford ..... SE NW SE 33-36n-65w
Rig, waiting on equipment.
A. B. Cobb 7 Novick ..... NW SE SW 6-35n-65w
T.D. 4,679 ft., fishing.
Continental 6 Apex-3 ..... SE NE NE 34-36n-65w
T.D. 5,316 ft., cemented 7-in. at 5,297 ft., will drill deeper.
Continental 12 Rohlff ..... SW NW SW 32-36n-65w
Drilling 5,200 ft. in sand; top second Leo 5,180 ft.
Continental 7 Apex-3 ..... SE SE NW 34-36n-65w
Coring at 5,396 ft., red marker 5,255 ft.
Ohio 17 Putnam ..... NW SE SW 33-36n-65w
T.D. 5,320 ft., cemented 7-in. at 5,317 ft.
Ohio 17 Lamb-Acct. 1 ..... NW NW NE 5-35n-65w
Drilling at 5,333 ft., cemented 7-in. at 5,262 ft.
Continental 8 Joss ..... SW NW NE 6-35n-65w
Drilling 5,211 ft., top Leo 5,181 ft., cored saturated sand at 5,192-97 ft.

Sublette County

North La Barge Oil Co. 1 Government, CNL NE SW 21-27n-113w, outside well on the north flank of the La Barge field, was dry at 2,050 ft.

North La Barge 1 State ..... SW SW SE 16-27n-113w
Rigging up. First report.
Texas 2-G Government .... NE NW NW 27-27n-113w
Location. First report.
Marvel 1-1 Government ..... SE NE SE 28-27n-113w
T.D. 762 ft., fishing.
Texas 1-F ..... SW SW SW 27-27n-113w
T.D. 1,084 ft., flowing.

Sweetwater County

Sinclair-Wyoming 75-A, the discovery well in the Tensleep at Lost Soldier, is rigging up to drill deeper and test the lower part of the sand which proved to be a prolific producer on the Wertz dome to the east. It was completed in December 1930 at 4,009 ft. for 2,500 bbl. of 35-gravity oil from the Tensleep at 3,942-4,009 ft., and stopped while still in sand. Sand is 300 ft. thick at Wertz. It is the only Tensleep sand well drilled at Lost Soldier.

Sinclair-Wyoming 75-A ..... NW SW NW 11-26n-90w
Drilling 4,027 ft.
Sinclair-Wyoming 94-A ..... NW NW NE 10-29n-90w
T.D. 1,900 ft., testing Lakota.
Farson Oil & Gas 1 Government .. SE NE 18-25n-108w
Drilling 1,100 ft.
Union Gas 1 Hummer ..... NW NW NE 6-17n-103w
T.D. 2,110 ft., rigging up rotary.
Mountain Fuel Supply 1 Murphy SE SE SE 27-17n-104w
S.D. 4,156 ft.
Gus Pongratz et al 1 Clark ..... NW NE 22-19n-104w
Drilling 4,126 ft., little oil and mud in D.S. test at 3,959-4,005 ft. and some gas and oil with 39 stands of salt water at 4,005-78 ft., top Entrada 3,959 ft.
Red Desert Corp. 1 Aspden .. NW SW NW 34-18n-103w
T.D. 3,970 ft. in Sundance, fighting lost circulation.
Vermilion Oil 2 Government .. SW SW SW 7-12n-99w
Drilling 3,370 ft., show of 1,500,000 cu. ft. of gas in sand at 3,254-58 ft., water shut off with 8⅝-in. at 2,995 ft.

Uinta County

McCurdy-Morgan 1 ..... SE SW SW 32-19n-116w
Spudding 60 ft. (Cumberland district.)
Elynor Oil 1 ..... NE SE SE 6-18n-116w
T.D. 805 ft., reaming below 700 ft. to land casing on bottom.

Washakie County

J. E. Longnecker 1 ..... CSL SW NE 24-47n-90w
Drilling 46 ft., 8¼-in. cemented 16 ft., show oil 44-46 ft. (Sherard structure.)

Weston County

Osage had two completions. Duluth-Wyoming 4 Government, SW SE 12-46n-64w, in the deep sand area of the field, was completed in sand at 1,310-24 ft. and made 5 bbl. a day initial on the pump after being shot with 30 qt.

Bert Higgins 5 Government, CNL NW SE 4-46n-63w, pumped 1½ bbl. a day at 320 ft.

Gose Oil Syndicate 1, NE cor. 28-47n-63w, Soda Creek district, which has been drilling intermittently since 1924, has resumed and is making hole at 5,032 ft. in sandy shale. It is presumably in the Frontier at this depth and the objective is the Newcastle, or Muddy sand.

Triangle 1 Draper ..... SE SE SW 24-46n-63w
Drilling 75 ft. First report.
Riggs Oil 4 ..... CNL NE SE 16-46n-64w
Drilling below 150 ft.
Joseph Dornacker 1 Kinney-Collins .. NW NE 33-45n-61w
Drilling 200 ft.
Lanam Crowley 1 ..... SW SW NW 8-46n-63w
Drilling 360 ft.
Charles Stough 12 ..... CWL SW NW 4-46n-63w
Skidded rig, drilling 140 ft. in new hole.
Pierre La Fleishe 1 Dober ..... NE NE NE 21-45n-63w
Drilling below 2,000 ft.
John Brorphy 1 Hansen .... NW NE NW 13-44n-63w
Cementing caves below 1,400 ft.

(Continued on Page 226)

Clay and Montague Strikes Assume Major Importance

By R. MARNE SANFORD

WICHITA FALLS, Tex., Sept. 16.—The two wildcat strikes, one each in Clay and Montague counties, continued for another week as the most closely watched of the many wildcats throughout the North Texas district.

The Clay County discovery, H. M. Horton and P. N. Wiggins, Dallas, 1 Howard, Block 31, T J. Belcher Survey, about 2 miles southeast of the town of Halsell and about 7 miles south of the Halsell field, has definitely opened a new Caddo lime field. The well flowed 66 bbl. of oil in 3 hours through tubing following initial acid treatment of 2,500 gal. early in the week. It was later acidized with 5,000 gal. and reported flows by heads, but not consistent. The hole was swabbed several times and kicked off to flow at the rate of 20 bbl. hourly. Testing was still under way at the close of the week. Production is from the Caddo lime topped at 5,458 ft. and drilled with saturation from 5,451 to 5,484 ft. The wildcat was originally drilled to a total depth of 5,500 ft and plugged back to the Caddo lime for completion after the deeper levels were found barren. The Halsell field to the north is producing from the 4,700-ft. level. Very little gas volume is reported at the new strike and some difficulty is being found in maintaining a steady flow. Should the well again die, as it has done several times while testing during the past week, operators will again acidize it with 7,500 gal.

The Montague County strike of last week Hults & Owens, Fort Worth, 1 Tucker, Section 2,836, T.E.&L. Survey, 7 miles northwest of Bowie and about 12 miles south of the Ringgold field, has not yet reported a gage. The plug in 7-in. casing was being drilled over the week end. Saturation in the Nocona lime was drilled from 6,010 to 6,050 ft., total depth. Prior to cementing casing last week, the well made several heads while a drill-stem test was being attempted. Oil from the hole tested between 48 and 50 gravity.

New Deep Fields Show Development

A new producer from the original 5,200-ft. conglomerate pay of the Bonita field in Montague County was recorded during the past week. It is Sinclair Prairie 3 Howard, W. Wallace Survey. Saturation in the conglomerate was drilled from 5,234-38 ft. and the well flowed 588 bbl. of oil in 7 hours while tubing was being run for completion. It has been shut in for official gage. The discovery well in the field was completed from the 5,200-ft. horizon, however, Sinclair Prairie's next two attempts were both dry in that pay and were also failures in the deep Ellenburger lime. They were both plugged back and completed for potentials in excess of 1,000 bbl. daily from the 5,400-ft. level. Since this time the majority of the wells have found their pay in the 5,400-ft. section. Sinclair Prairie 3 Howard, is one of the few wells to find saturation in the original discovery horizon.

Materials were being moved in over the week end for the starting of a new test in the Norwood-Hapgood area recently opened in eastern Clay County. The new test is R. C. Lipscomb 1 K. N. Hapgood, 467 ft. from the north and east lines of NW Block 68, Marion County School Lands, about 1,000 ft. southeast of the discovery well which was completed from the Bend lime from 5,972-84 ft.

Wildcats Get Shows

A show of oil was tested at Shell Oil Co., Inc.'s wildcat on the Coleman land, Block 74, A.T.N.C.L. Survey in Archer County and 4 miles northwest of Scotland. Sand showing oil was drilled from 3,648 to 3,680 ft. and from 3,692 to 3,700 ft. early in the week. Drill-stem tests of the section, with tool open 15 minutes, recovered 150 ft. of oil, 500 ft. of oil-cut mud and 150 ft. of drilling mud. Bottom-hole pressure was reported to have tested 1,650 lb. The wildcat was drilling below 4,000 ft. at the close of the week.

An interesting feature of the Fort Worth basin was revealed during the week when Cranfill & Rogers 1 McKay, wildcat test drilling in northwestern Wise County, topped the Caddo lime at 5,585 ft. This top is only 127 ft. lower, excluding slight elevation differences, than the top of the Caddo lime reported in the Horton-Wiggins discovery well southeast of Halsell in Clay County some 40 miles to the northwest. This leads to one of three possible conclusions. Either the Fort Worth basin is not as much of a basin as first believed, or the Cranfill & Rogers test is on an extremely high local structure, or it is on the eastern flank of the Bend arch. This latter possibility would mean that the Fort Worth basin does not have as much width as was first expected when it was thought to be defined by the eastern extremities of the Bend arch in about central Jack County. Many geologists are still of the opinion that the deepest part of the basin is not in the middle but near the eastern edge and along the truncation of the basin's strata with the Muenster arch.

NORTH TEXAS COMPLETIONS
(24-hour gages)

Archer County

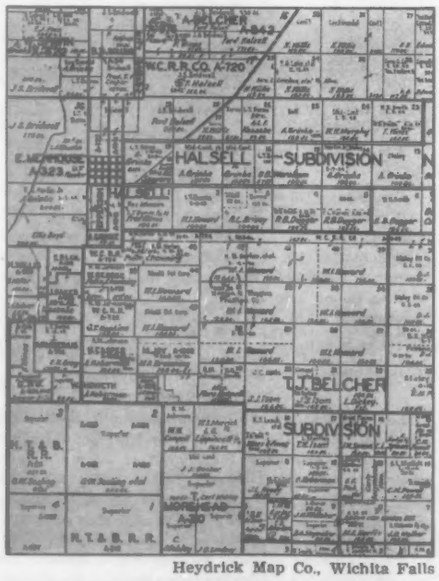
Hull-Silk field: Blackwell and Helmerich & Payne 10 Wilson, 1,090 bbl., 4,330-55 ft.
Continental 20 Wilson-McCrory, 776 bbl., 4,307-82 ft.
Bert Ligon 1 White B, dry at 4,773 ft.
Bert Ligon 4 White E, 80 bbl., 3,856-3,912 ft.
Bert Ligon 9 White E, dry at 999 ft.
Lipscomb 4 Wilson-McCrory, 576 bbl., 3,811-36 ft.
Magnolia 12 Rutty, 675 bbl., 3,743-89 ft.
Petroleum Producers 1 Carson, 1,200 bbl., 4,357-4,400 ft.
Olney field: L. T. Burns 6 Blewitt, 10 bbl., 1,468-78 ft.
L. T. Burns 2 State, abandoned location.
Megargel field: Shell 8 Colgan, 30 bbl., 1,446-58 ft.

Clay County

Thornberry field: Bridwell Oil 15 Edrington, dry at 1,680 ft.
Gorman & Norwood 1 Taylor, dry at 1,156 ft.
Sussex Oil 11-A Glasgow, 10 bbl., 1,090-98 ft.

Cooke County

T.C.U. field: Dodson & Powell 2 Lynn, 200 bbl., 1,056-65 ft.
Dodson & Powell 3 Lynn, 154 bbl., 1,035-46 ft.
Russell & Russell 2 Rosson, 50 bbl., 1,113-32 ft.
Walnut Bend field: Sinclair Prairie 1 Timmis, 670 bbl., 4,889-4,914 ft.
Muenster field: Texas 22 Truebenbach, 50 bbl., 799-802 ft.



Heydrick Map Co., Wichita Falls

Clay County's new field discovery is Horton-Wiggins 1 Howard, Section 31, T. J. Belcher subdivision, just southeast of Halsell and about 6 miles south of the 4,700-ft. Halsell field. The discovery gaged 20 bbl. of oil hourly on early tests

Denton County

Wildcats: Trentman Oil 1 Foster, abandoned location.
Trentman Oil 1 Madewell, abandoned location.

Jack County

Bryson field: Three B Inv. Corp. 2 Rankin, 288 bbl., 3,073-3,100 ft.

Montague County

Rogers & Rogers field: Lesh & McCall 2 Beck, abandoned location.
Rogers & Rogers 5 W. Astley, 1,456 bbl., 4,404-47 ft.
Wildcat: Peckham 1 Lawson, dry at 6,133 ft.

Wichita County

K.M.A. field: F. H. E. Oil & Kimbell 3 Strauss, 650 bbl., 3,815-87 ft.
Hanlon-Buchanan 19 Fassett-Tuttle, 511 bbl., 4,025-4,132 ft.
Texas 6 Thom, 480 bbl., 3,783-3,843 ft.
Burkburnett field: Fisher & Dudley 11 Warren, dry at 1,642 ft.
Sunshine Hill field: R. Kohlman 5 Mertens, dry at 1,435 ft.

Wilbarger County

South Vernon field: Baker 2 Waggoner-Gimlett, dry at 2,475 ft.

Young County

Markley field: Boyd & Kimberlin 3 McDonald, dry at 620 ft.
Willis 1 Stewart, dry at 860 ft.

NORTH TEXAS DRILLING REPORT

Archer County

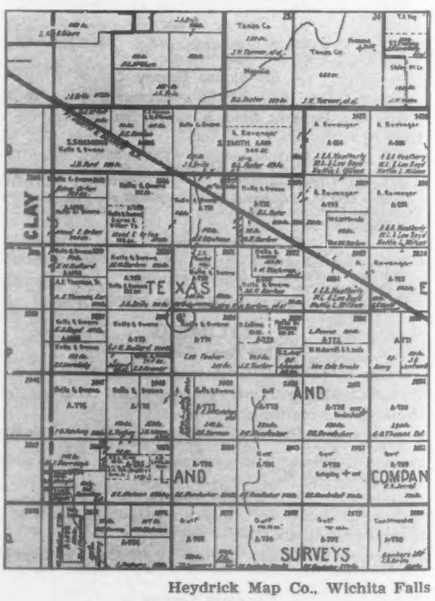
Clark 1 Goldsmith, Blk. 6, S.A.R. Sur., 5,259 ft., T.D., last report.
British American 1 Wilson, Sec. 2, B.B.B.&C. Sur., set 10-in. casing at 106 ft., top Ellenburger 5,414 ft., T.D. 5,465 ft., S.D.O.
Shell 1 Coleman, Lot 3, Blk. 74, A.T.N.C.L. Sur., S.S.O. 3,648-80 ft., D.S.T. 15 min., recovered 650 ft. oil and mud. Drilling ahead 4,075 ft.

Baylor County

Rogers & Lanfair 1 Howe, J. Lowe Sur., Abst. 572, S.D.O. 2,215 ft.

Clay County

L. T. Burns 1 Calloway, Lot 9, Hopkins County School Lands Sur., Abst. 176, T D. 5,356 ft., new contract depth 6,000 ft., C.O. 4,150 ft.
Frabor-Hodges 2 Kinder, Lot 17, Blk. 2, Clark & Plumb Sur., drilling 4,065 ft.
Horton & Wiggins 1 W. J. Howard, Blk 31, T. J. Belcher Sur., drilled saturation 5,460-81 ft., D.S. test showed 40 ft. oil-cut mud. T.D. 5,604 ft., P.B. to 5,488 ft. and set 5½-in. casing 5,460 ft., flowing 10 to 12 bbl. an hr. Re-treated with 5,000 gal.; est. 250 B.O.P.D.
Omohundro 1 Kempner, Bosque County School Land, old T.D. 4,268 ft., drilling 4,921 ft
Roberts, Lynch & Jones 1 Edwards, Blk. 40, Madison



Heydrick Map Co., Wichita Falls

Montague County's new field discovery is Hults & Owens 1 Tucker, Section 2836, T.E.&L. Survey, 7 miles northwest of Bowie. Plug was being drilled early this week after saturation was drilled in the Nocona lime

County School Lands Sur., 6,500-ft. test, drilling 5,402 ft.
Walter Gant 1 Stine, Sec. 25, H.&T.C. Sur., 6,000-ft. test; 10-in. at 510 ft., drilling 2,210 ft.

Denton County

Amon G. Carter 1 W. P. and A. P. Allen, S. Westbrook Sur., S.D. 4,000 ft., planning to drill deeper.
Harvey Bros. 1 Knox, R. Howard Sur., Abst. 542, old T.D. 1,357 ft., show oil 1,467-93 ft., set 6⅝-in. at 1,465 ft., drilled plug, show oil and gas, testing.

Grayson County

Texas Co. 1 Hutchinson, Samuel Stewart Sur., northeast corner of county, 7,500-ft. test. M.I.M.

Hardeman County

Norris & Gilbert 1 Robert Weekley, SW SE Sec. 87, Blk. 16, H.&T.C. Sur., show oil in lime 3,810 ft., drilled saturation 3,810-70 ft., show oil in lime 3,867-3,906 ft., S.D.

Jack County

R. A. Conkling 1 M. Hoofle, A. James Sur., Abst. 318 3 mi. south Antelope, 3,500-ft. test, drilling 2,480 ft.
Continental 1 Robertson, M. J. Swan Sur., Abst. 1650, 4,600-ft. test, drilling 4,423 ft.
Rathke Oil 1 Moseley, J. Harrison Sur., Abst. 259, drilling 2,927 ft.

Montague County

Walter Gant 1 Will Laird, R. T. Millard Sur., Abst. 470 7 mi. west of Sunset, 6⅝-in. casing at 6,641 ft., T.D. 6,651 ft., prep. perf. csg. and test.
Hults & Owen 1 Tucker, NW cor. Sec. 2836, T.E.&L. Sur., slight show of oil 5,020-34 ft. and 5,210-26 ft., drilling saturation 6,010-50 ft., cemented casing 6,016 ft., drilling plug 5,962 ft.
A. R Dillard 1 Holland, M. Montalba Sur., 10-in. set at 375 ft., drilled saturation 5,505-13 ft., drilling ahead below 5,725 ft.
Seitz, Comegy & Seitz 1 Harris, B.B.B.&C. Sur., 10 mi. south of St. Jo, 6,000-ft. test, drilling 3,465 ft.

Wilbarger County

Amerada 1 Parker, Sec. 36, Blk. 15, H.&T.C. Sur., drilling 2,015 ft.

Wise County

Cranfill & Rogers 1 McKay, Sec. 8, Falls C.S.L. Sur., drilling conglomerate showing oil 5,707-10 ft., cored 5,710-14 ft., test showed only mud. Drilling ahead below 5,725 ft.

WEST CENTRAL TEXAS

FORT WORTH, Tex., Sept. 16.—Activity in Jones County's newest Palo Pinto lime field, the Nowles field, led the developments of West Central Texas during the past week. A south outpost was preparing for completion and a new further south outpost had been staked.

The prospective extension is J. C. Hunter 1 Strand, about ½-mile south of the first extension producer into Jones County, the discovery well having been in extreme southern Haskell County. No. 1 Strand, SW cor. SW Section 5, Block 5, H.&T.C. Survey, drilled saturation in the Palo Pinto lime from 3,420-28 ft. and was preparing to cement 6⅝-in. casing on top of the lime at 3,418 ft. The well is bottomed at 3,428 ft.

About ⅛ mile southeast of the prospective producer, Dean Brothers, Fort Worth, staked their 1 W. M. Carlton, NW cor. of a 240-acre tract in the northwest part of Section 3, Block 5, H.&T.C. Survey. The completion of the new well will make a total of three producers in the new area. The trend of production has not been definitely determined in the area, however, some drilling is predicted for the field during the fall months.

Shackelford County's long-shutdown wildcat by John E. Carson in the R. A. Elliott lands, Section 49, B.A.L. Survey, resumed drilling. Projected to the Caddo lime at about 3,620 ft., it had been shut down at a total depth of 1,685 ft. The location is on the southwest flank of the old, deep Ibex field structure.

A closely watched wildcat test in Jones County was preparing to test as the week closed. It was Charter Oil 1 Nobles, B. Trevino Survey. Lime showing oil was drilled from 2,151-60 ft. and from 2,225-47 ft. The results of the initial tests will determine whether casing will be cemented for completion attempts.

WEST CENTRAL TEXAS COMPLETIONS

(24-hour gages)

Brown County

Wildcats: F. Brittain 1 McEnloe, dry at 50 ft. J. E. Whitesides 1 Shelton, dry at 605 ft.

Callahan County

Putnam field: A. Hutton 1 McKinney, dry at 420 ft.

Palo Pinto County

Mingus field: W. K. Gordon 1 Strawn-Edwards, dry at 4,497 ft.

Shackelford County

Sedwick field: Grossenbacher 11 Hickman, dry at 670 ft.
Moran field: Sabens 1 English, dry at 652 ft.
Cook field: Roeser-Pendleton 17-B-113 Cook, dry at 1,703 ft.

WEST CENTRAL TEXAS DRILLING REPORT

Callahan County

Merry Bros. & Perini 1 Yost, NW NW Sec. 18, Blk. 8, S.P. Sur., 3,200-ft. test, coring 3,200 ft.
N. D. Gallagher 1 E. Grisson, SE part Sec. 2, Blk. 8, S.P Sur., top lime 1,695 ft.; fag. U.R. lugs at 1,700 ft., T.D.

Coleman County

Stuard 1 Minear, E. V. Otaw Sur. 244, location.

Comanche County

C. D. Lane 1 H. W. Strout, 3,080 ft. from N, 2,200 ft. from E lines of E. D. Corbett Sur., Abst. 154. Rng. 6⅝-in. csg. 2,900 ft.
Lone Star 1 Watkins, Sec. 30, Blk. 3, B.B.B.&C. Sur., 3,000-ft. test, drilling 356 ft.

Eastland County

Dobbs Oil 1 Poe, Sec. 37, Blk. 3, H.&T.C. Sur., water sand 1,581-97 ft., set 6⅝-in. csg 1,587 ft., drilling ahead 2,000 ft.

Fisher County

F. A. Stephenson 1 Maberry, SE SW Sec. 56, Blk. 1, H.T.&B. Sur., 3,400-ft. test, cored 3,285-3,302 ft., recovered sand showing oil. Prep. to test.
General Crude Oil 12 Flanigan, center of old Royston field. Ordovician test, 18⅝-in. csg. 80 ft.; drilling 585 ft.

Hamilton County

A. J. Caldwell 1 W. W. Jones, 1,002 ft. from NE, 150 ft. from SE lines of W. H. Crowder Sur., S.D. 3,010 ft.

Jones County

Charter Oil 1 Nobles, B. Trevino Sur., show oil in lime 2,151-60 and 2,225-40 ft., prep. to test.
J. C. Hunter 1 Strand, SW NE Sec. 5, Blk. 5, H.&T.C. Sur., drld. sat. 3,426-28 ft., top Palo Pinto lime 3,418 ft., rng. 6⅝-in. csg. for completion.
Best 1 A. A. McDuff, 5.200 ft. S, 1,100 ft. E lines of J. J. Hughes Sur., set 6⅝-in. casing at 2,040 ft., S.D.O. 2,393 ft.

Parker County

Brown & Gardner Bros. 1 Gilbert, T.&P. Sur., Abst. 1958, casing set 3,905 ft. est. 500,000 cu. ft. gas and spray oil, slight show oil 4,405-15 ft., T.D. 4,900 ft., fishing tools.
C. Leidecker and William Holland 1 J. A. Boyd, NE NE of S 100 acres of A. J. Edwards Sur., 4,500-ft. test, S.D. 2,410 ft.

San Saba County

Three Widows Oil 1 Ballard, NW cor. S½ Sec. 80, H Behrenroth Sur. 506, 2,000-ft. test, drilling 210 ft.

Shackelford County

Tal Vez Oil 1 Dyer, Sec. 83, Blk. 12, T.&P. Sur., drilling 875 ft.
Carson 1 Elliott, Sec. 49, B.A.L. Sur., resumed drilling after being shut down at 1,685 ft. Caddo lime test to 3,620 ft. Rng. 10-in. csg. to 1,685 ft.

Stephens County

Gourley & Fagg 1 Rogers, Sec 28, Blk. 5, T.&P. Sur. Drilled sat. 3,663-80 and 4,010-26 ft.; C.O. after shot at T.D. 4,097 ft.

Tarrant County

Hickey 1 Baltzelle, NE cor. William Scott Sur., T.D. 930 ft.; drill pipe froze.

Taylor County

Ce-beth Oil 1 City of Abilene, south shore of Lake Abilene on city property, 4,000-ft. test, corrected report. Drill pipe stuck at T.D. 1,940 ft.

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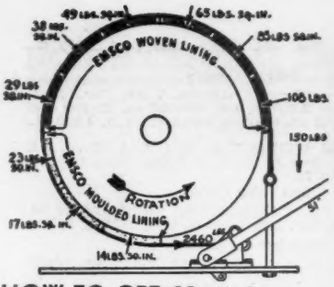
WICHITA FALLS, TEXAS
Tel. 2-4307—W. E. (Bill) Horton



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Among the Drilling

O. W. DYER, Houston, Tex., is drilling below 9,500 ft. in Atlantic No. 1 W. E. Conwell, an important outpost well located in the Thomaston field, De Witt County, Texas. Another operation is reported for the same company in the McCampbell field in Aransas and San Patricio counties.

GROOVER & ROSE, drilling contractors of Albany, Tex., have rigged up machinery and are again drilling a wildcat test in Shackelford County, West Central Texas, which has been shut down for several weeks. It is John E. Carson's No. 1 R. A. Elliott, Section 49, B.A.L. Survey, on the southwest flank of the old Ibex field structure. Contracted to the Caddo lime, expected at about 3,620 ft., the test is drilling below 1,685 ft.

DAN CLARK, Kingsville, Tex., completed Wellington No. 1 Howze as a producer to join the Minnie Bock and North Clara Driscoll fields in Nueces County, Texas. The well was completed in the 3,800-ft. pay, and is flowing into the tank through a small choke.

J. C. HUNTER and S. B. ROBERTS, Abilene, Tex., have received contract from Dean Brothers, geologists, Fort Worth, Tex., for the drilling of a Palo Pinto lime test in Jones County, West Central Texas. The Dean Brothers test will be No. 1 W. M. Carlton, W½ Section 3, Block 5, H.&T.C. Survey, a mile south of the Palo Pinto producing Nowles field opened last winter on the Haskell and Jones county line. The contract depth is 3,400 ft.

JORDAN Drilling Co., Houston, Tex., is reported to be running casing in its No. 1 Warren Minerals Corp., located on the old Hockley dome, Harris County, Texas. This well was deepened from an old total depth of 2,090 ft., to 2,230 ft., and casing will be cemented to test at approximately 1,800 ft.

MARSHALL & RILEY, Oklahoma City, Okla., is preparing to drill the plug at a prospective discovery well in the Fort Worth basin of North Texas for Hults & Owens, Fort Worth, Tex. The wildcat is No. 1 Tucker, located in Section 2836, T.E. &L. Survey, about 7 miles northwest of Bowie in Montague County. Saturation in the Nocona or Caddo lime was topped at 6,010 ft. and drilled to total depth of 6,050 ft. The casing is cemented at 6,016 ft.

JACK W. FRAZIER, opened the first commercial production in the old Mount Houston area, just northwest of Houston, Harris County, Texas, with the completion of H. C. Cockburn No. 1 Burkitt, completed in the Frio formation at approximately 4,800 ft. Location for a second test was made, and the rig is expected to be moved to the new location.

OLSON Drilling Co., Tulsa, has received contract from Landreth Production Corp., Fort Worth, Tex., for the drilling of a 2,500-ft. wildcat test in northern Pecos County, West Texas. It will be drilled with rotary and is the No. 1-C McDonald, located 467 ft. from the south and east lines of Section 37, Block 11, H.&G.N. Survey, 9 miles north and slightly west of the Taylor-Link field.

ROWAN Drilling Co., Houston, Tex., cemented surface casing in No. 1 Bradbury, about ⅛ mile east of the discovery well of the Rowan field, Brazoria County, Texas. Another rig is running in the West Beaumont field, Jefferson County, for Hebert & Smith.

DELTA Drilling Co., Tyler, Tex., is drilling below 3,573 ft. at a test recently started in the deep Opelika field of Henderson County, eastern Texas, for Lone Star Gas Co. and Shamrock Oil & Gas Co., operators in the field. It is the No. 1 C. H. Allyn, 506 ft. from the west and 2,100 ft. from the north line of the John Lawson Survey, approximately ½ mile south of the two large gas wells in the field.

HOUSH & THOMPSON, Houston, Tex., received contract for two Gulf Coast Texas wells, and equipment is being moved to location. In the Chocolate Bayou field, Brazoria County, No. 1 Houston Farm Development Co., a projected 10,500-ft. test, will be drilled for Phillips Petroleum Co., while in North Markham field, Matagorda County, No. 2 Cornelius will be drilled for the Ohio Oil Co. Three other operations are reported at the Eola, East Hackberry and Hull fields for Gulf Oil Corp., while at the Greens Lake and Shepherd areas in Galveston and San Jacinto counties, two rigs are running for Sun Oil Co., and Harrison & Abercrombie. The test in San Jacinto County is exceptionally interesting as 5½-in. casing was cemented at 8,400 ft., preparatory to testing the Wilcox sand.

GRAY & WOLFE, Houston, Tex., drilling for British American Producing Co., offshore from Jefferson County, Texas, in the Gulf of Mexico,

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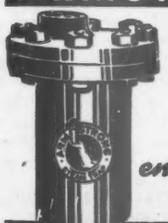

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Contractors

has reached a depth of 6,970 ft., and is drilling ahead, while piling is being driven in the same area for the company's No. 1-71 State.

PARKER Drilling Co., of Fort Worth, Tex., is moving material in for a wildcat test to be drilled for the Texas Co. in Grayson County, approximately 13 miles northeast of the Walnut Bend field in Montague County, Texas.

JUDD & SON, drilling contractor of Martin City, Mo., has started drilling on Everett Williams et al's No. 1 Tom Hiatt, a new Carroll County, Missouri, test. Location is 500 ft. east and 250 ft. south of C SE Section 7-52n-22w, and the test is to be drilled tight.

EARL K. CAREY Drilling Co., Wichita, completed a big producer in the Bornholdt, Kans., field at total depth 3,315 ft. in Mississippi chat, for maximum daily potential of 3,000 bbl. of oil.

OLSON Drilling Co., Tulsa, has contracted to drill a 5,500-ft. test for Ramsey Petroleum Co., Oklahoma City, at No. 1 Lynch Brothers, SW Section 66, in the J. Poitevent Survey, about 8 miles southwest of Paducah, Cottle County, Texas. Location is on a surface structure worked by Willard Miller, chief geologist of the Ramsey company.

N. V. DUNCAN may be the first drilling contractor to drill in the bed of the historic Wabash River between Illinois and Indiana. Duncan's rig just finished drilling the Longhorn Oil Co.'s No. 1 W. W. Gray in Section 14-3n-14w, on the west bank of the Wabash River. Duncan crews are busy on two more wells on the sand bar along the river and just across from heavy production on the Indiana side. The main production in the area is from the McClosky lime, although Duncan is preparing to complete his No. 2 Edith Helm in Section 15-3n-14w in the Biehl sand at 1,839 ft.

HERNDON Drilling Co. and J. Garfield Buell, Tulsa, recently completed their third Benoist well on the John Bond farm in Section 8-4n-14w, Edwards County, Illinois. The farm is located in the Calvin pool, one of the first fields to show good Benoist production on the eastern side of the state.

ZEPHYR Drilling Co., Tulsa, was preparing to complete No. 3 Stevens, SW NW SE Section 31-6n-3e, the St. James Pool, Fayette County, Illinois. The well was testing Weiler sand at a total depth of 1,617 ft. The same company had casing set on the No. 4 Stevens, NW NW SE of the same section, with the Weiler sand being located at 1,603-14 ft.

PORTABLE Drilling Co., Tulsa, opened the Perkins pool in Payne County, Oklahoma, several weeks ago with a 600-bbl. producer, and it still looks like a one-well pool. Latest test to be drilled by the Portable company at No. 1-A Kint, NE NE SE Section 31-21-2w, west offset to the discovery, had salt water and a small amount of oil at total depth of 4,495 ft. in Hunton lime. It was to be plugged back and tested in upper zones. Four other tests drilled in the Perkins area since the discovery was completed were dry.

Crew on day tour of Reading & Bates Drilling Co., Tulsa, at a well being drilled in the Foster field, Ector County, West Texas: C. H. Meyers, driller; Ed Kindrick, floor man; E. E. Mason, derrick man; and G. T. Dyson, floor man

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Extension, New Deep Sand Found in Wade City Field

By
F. L. SINGLETON

CORPUS CHRISTI, Tex., Sept. 16.—New sand discoveries, extensions to proven fields and promise of several new producing areas being added to the district, featured developments in the Southwest Texas district the past week.

The east flank of the Stratton field received a ¼-mile east extension, and a new sand discovery as S. E. W. Oil Co. 1 Union Central Life Insurance Co., flowed 94 bbl. per day through a ½-in. choke under a tubing pressure of 340 lb. and shutin casing pressure 980 lb. The well was drilled to a total depth of 7,168 ft. and was completed through perforated casing at 6,680-6,702 ft. In the same area, Southern Minerals Corp. was expected to cement a production string of casing in 3 Stratton Community following an electrical survey at 6,924 ft. No additional showings have been reported, and the well is expected to be completed at 6,578-90 ft., where a drill-stem test recovered several hundred feet of oil.

The newly opened Shield field, Nueces County was assured of its second producer as Fred W. Shield 1 W. L. Lewis, flowed pipe-line oil and recovered 2,200 ft. of pipe-line oil on a 10-minute drill-stem test at 6,608-14 ft. The sand section was topped at 6,606 ft., and was cored to 6,617 ft., the total depth. The hole may be cored a few feet deeper before casing is cemented for completion. Location is in the S.K.&K. Survey 147. Drilling was started on Stanolind 1 Bennett Ocker in the McGregor Survey 40.

The Minnie Bock and North Clara Driscoll fields, Nueces County were being joined as Wellington 1 Howze, midway between the two fields was reported to be flowing into the tanks, although no gage had been made. The well is testing through perforated casing at 3,819-22 ft., and tubing pressure was 285 lb., and casing pressure 375 lb.

East Flour Bluff Extension

Production in the East Flour Bluff field, Nueces County was extended as Humble 2-D State, was completed for an initial production of 160 bbl. per day through a ¼-in. choke. The hole is bottomed at 6,803 ft. and 5½-in. easing was cemented at 6,780 ft.

Location for an interesting 7,000-ft. wildcat was announced for the county by R. S. Waldron et al for 1 M. E. Lear, 4 miles south of Corpus Christi in Block 2, Section 4, Bohemian Colony subdivision in the E. Villareal grant.

A new producing area, or a major extension to the Wade City field, Jim Wells County was assured by the showing of H. R. Smith 1 Schumacher, which is bottomed at 5,002 ft. with 5½-in. casing cemented at 4,860 ft. preparatory to testing at 4,815-18 ft., a 15-minute drill-stem test showed 70-lb. working pressure and flowed oil for several minutes. When the testing tool was broken down, 4,000 ft. of oil and 30 ft. of salt water was recovered. The well is located in the G. J. Reynolds Survey, about 1½ miles southeast of the Wade City field, and about 1,500 ft. southeast of the same operator's 1 Thiel, which flowed oil and salt water from the same sand section several weeks ago. The sand section corresponds with that of the Wade City field, but whether the two areas are located on the same structure cannot be ascertained until additional development is started.

In the Wade City field, Anderson-Prichard Oil Corp. apparently opened a new sand for the field by the showing of 5 A. G. Mueller, located on the extreme west side of the field in the G. J. Reynolds Survey. A 15-minute drill-stem test at 4,905-14 ft. recovered 2,300 ft. of 31-gravity oil, and casing was cemented for a production test. This is a deeper sand for the field, being several feet deeper than the 4,800-ft. pay.

Duval County

Along the Cockfield sector of Duval County, and 4 miles southwest of the town of Realitos, Humble 1-B Mull, was attracting attention as showings of oil and gas were reported. Sand with an oil and gas odor was logged at 4,491-4,500 ft., and on a drill-stem test, 180 ft. of salt water recovered. Working pressure tested 3 lb. Another 30-minute test at 4,514-26 ft. tested 90 lb. working pressure, and recovered 90 ft. of oily mud, and 360 ft. of salt water. The well is coring ahead below 4,600 ft.

Humble 1 E. D. Nave, approximately 1 mile east of the East McFaddin area, Victoria County is shut in after flowing 20,000,000 cu. ft. of gas through open tubing. Tubing pressure was 1,800 lb. and casing pressure 2,000 lb. The hole is bottomed at 6,076 ft., and the well was completed through perforated casing at 5,930-35 ft. Location is in the Maria J. Traviesa Survey

E. M. Jones 1-B West, a Wilcox test, 2½ miles southwest of the town of George West, Live Oak County was attracting attention as the well attempted to blow out when sand with an oil and gas odor was cored at 8,132-48 ft. A 16-minute drill-stem test at 8,090-8,100 ft. tested 15 lb. working pressure. The sand section is believed to be the Carrizo formation. At the close of the week, another core was being cut and an electrical survey was scheduled to be made. This is the second Wilcox test to be drilled in the County by the same operator, being several miles south of 1 West, a 10,000-ft. dry hole which logged several showings in the Wilcox.

Miscellaneous Wildcats

In the Thomaston field, De Witt County, Atlantic 1 W. E. Conwell, 1 mile northeast of the discovery well, is drilling in shale below 9,500 ft., with no further showings reported.

Sun 1 Saenz, a wildcat north of the North Rincon field in northeastern Starr County continues to core additional sands, and the well is practically assured of opening a new field for the county. Sand with an oil and gas odor was cored at 5,272-75 ft., and at 5,-312-15 ft., while a 10-minute drill-stem test at 5,472-80 ft. tested 640 lb. working pressure and recovered 290 ft. of pipe-line oil. Another test at 5,494-5,503 ft. recovered 335 ft. of oil and a small amount of salt water, and the well is coring ahead below 5,590 ft.

Complete Oil Well Service, Inc. 1 Yzaguirre, the discovery well of the Yzaguirre field, Starr County was recompleted through perforated casing at 4,608-17 ft., and the well is flowing 21 bbl. of oil and 7 bbl. of salt water per day through a ⅜-in. choke. Tubing pressure was 300 lb. The well was originally completed at 4,612-18 ft.

Texas 1 Armstrong, an outpost test in the Manila field, Jim Hogg County, is being completed as a gas well after plugging back from a total depth of 3,687 ft., and testing at 3,618-56 ft., where it showed 550 lb. working pressure through a ⅝-in. choke.

A major extension to the Rincon field, Starr County was indicated by the showing of W. R. Davis, 17-A Slick, approximately 1 mile southeast of production. The well is coring ahead in search of additional sands after 720 ft. of pipe-line oil was recovered on a drill-stem test at 3,962-73 ft. Development at Rincon has proven this field to be one of the most prolific structures in South Texas.

SOUTHWEST TEXAS COMPLETIONS

CORPUS CHRISTI DISTRICT

Aransas County

McCampbell field: F. A. Gillispie 1 C. E. Littlefield, 114 bbl., ½-in. choke, perf. casing 6,840-45 ft., T.D. 7,250 ft.

Jim Wells County

Orange Grove field: Plymouth 2 Boehm, 113 bbl., 7/64-in. choke, perf. casing 5,106-10 ft., T.D. 5,111 ft.
South Alfred field: Lewis Production Co. 3 Adams, dry, T.D. 4,882 ft.
Wade City field: Atlantic 3 Mueller, 96 bbl., 1/4-in. choke, perf. casing 4,790-92 ft., T.D. 4,794 ft.
Rodney LeLange 3 McNeill, 269 bbl., 1/4-in. choke, perf. casing 4,922-32 ft., T.D. 4,936 ft.
Henshaw Bros. 2 Schreade, 153 bbl., 1/4-in. choke, perf. casing 4,922-33 ft., T.D. 4,933 ft.
Magnolia 3 Schmidt, 82 bbl., ¼-in. choke, perf. casing 4,920-24 ft., T.D. 4,928 ft.

Nueces County

Agua Dulce field: Gulf Plains 4 Eliff, 56,000,000 cu. ft. gas and 20 bbl. distillate, open flow, perf. casing 4,733-4,812 ft., T.D. 4,988 ft.
Stratton field: Gulf Plains 1 Texon Royalty fee, 66,-000,000 cu. ft. gas and 30 bbl. distillate, open flow, perf. casing 4,720-39 ft., T.D. 4,827 ft.

Refugio County

Tomoconnor field: Quintana 15 Heard, 629 bbl., ¼-in. choke, perf. casing 5,823-31 ft., T.D. 5,925 ft.
Refugio field: Laura C. Oil Co. 11-B Morgan, 2,000,000 cu. ft. gas, and 50 bbl. distillate, 1/4-in. choke, perf. casing 5,920-24 ft., T.D. 6,175 ft.

San Patricio County

East White Point field: Sinclair Prairie 9-907 State, 249 bbl., 1/4-in. choke, perf. casing 5,620-28 ft., T.D. 5,630 ft.
East Plymouth field: Sun 1 Douglas, 5 bbl. distillate, ⅛-in. choke, perf. casing 5,632-34 ft., T.D. 5,680 ft.

LAREDO DISTRICT

Duval County

Cedro Hill field: Magnolia 10 Duval County Ranch, 16 bbl., ¼-in. choke, perf. casing 1,473-75 ft.
Wildcat: Boedeker 1 Gruy, dry at 2,911 ft.
Magnolia 2 Lopez, dry, 3,327 ft.

Hidalgo County

Samfordyce field: Royal Oil & Gas 1 Flores, 66 bbl., 9/64-in. choke, perf. casing 3,463-67 ft., T.D. 3,-476 ft.
Phillips 3 Salinas, 67 bbl., 14 hr., 3/32-in. choke, perf. casing 4,117-32 ft., T.D. 4,185 ft.

Jim Hogg County

Colorado field: Humble 19 Atwood, 72 bbl., 1/4-in. choke, T.D. 3,098½ ft.
Neuhaus 2-F Trevino, 200 bbl., ¼-in. choke, sand 2,937-51 ft., T.D. 2,951 ft.
Sun 7 Thaxton, 227 bbl., 1/4-in. choke, sand 3,005-13 ft., T.D. 3,013 ft.
Manila field: Navarro 3 Wood, 20 bbl., 9/32-in. choke, sand 2,594-2,606 ft., T.D. 2,606 ft.
Wildcat: Seaport 1 Vela, dry, 3,013 ft.
Texas 1 Armstrong, dry, 3,691 ft.

McMullen County

Calliham field: Jake Jarmon 1 Hayter, dry, 2,903 ft.
Marion Production 1-69 Lark, dry, 1,085 ft.

Starr County

Boyle field: Fidelity Oil & Royalty 1-B Carruth, 57 bbl., ⅛-in. choke, perf. casing 3,489-3,500 ft., T.D. 3,502 ft.

Webb County

Glen field: A. S. Moody 1 Bruni, dry gas well, perf. casing 2,159-64 ft., T.D. 2,169 ft.
Wildcat: Harvey & Henderson 1 Bruni, dry, 1,509 ft.
Boysen & Jones 7 Watkins, dry, 851 ft.

SAN ANTONIO DISTRICT

Bastrop County

Cedar Creek field: Marts & Beaven 6-A Reyes, 7 bbl., oil and 7 bbl. water, T.D. 1,808 ft.
Wildcat: Augst Bering 1 Rivers, dry, 2,433 ft.
Fritz Fuchs 1 Kicksey, dry, 2,120 ft.

Caldwell County

Buchanan field: A. F. Barnhill 1 Robuck, dry, 2,308 ft.

Frio County

Pearsall field: Falcon-Seaboard 1 Haiff & Oppenheimer 83 bbl., ⅛-in. choke, perf. casing 3,932-36 ft., T.D. 3,938 ft.

Milam County

Wildcat: W. H. McGuire 1 Brockenbush, dry 1,004 ft.

Williamson County

Wildcat: J. G. Hodges 1 Adamek, dry 1,447 ft.

SOUTHWEST TEXAS DRILLING REPORT

Aransas County

Atlantic 1 Guaranty Bond, deep test, E side of McCampbell field, drilling shale 9,500 ft.

Bee County

W. E. Rowe and McBride 1 Meyer, NE of Tynan, tested 250 lb. working pressure on D.S. test 4,800-04 ft.

Brooks County

Sun 1 Boedeker, R. Guzman Sur. 16, drilling sand and shale 6,982 ft.

De Witt County

Atlantic 1 W. E. Conwell, NE of discovery well, Thomaston field, drilling shale 9,550 ft.

Hidalgo County

Humble 1 American Life Insurance Co., 3½ mi. N of Hargill townsite, drilling shale 4,689 ft.

Kenedy County

Hundred and One Oil Co. 1 Kenedy, Jose Antonio Leal De Leon gr., coring sand 5,508 ft.

(Continued on Page 227)

La Salle Parish Wilcox Play Assuming Major Importance

By GEORGE WEBER

SHREVEPORT, La., Sept. 16.—The Jena district of La Salle Parish continued as the most interesting district in the tristate area during the past week. With one wildcat nearing completion in the Wilcox sand and a second test scheduled to core the Wilcox this week end, the district stands out from the relative inactivity elsewhere. Olla, the Wilcox oil and gas field to the north of the two wildcats, is North Louisiana's most active new field from the standpoint of drilling with nine active operations and many new locations staked for early drilling.

Arkansas entered the picture this week with a large initial producer in the Nick Springs area of Union County and a good well indicated for the McKamie pool. Fouke was again defined by a failure in the Paluxy formation.

La Salle Parish Tests

Atlantic 1-B Goodpine, wildcat 10 miles south of Olla and about 6 miles southwest of the prospective Jena field, is attracting most attention this week as it approaches pay in the Wilcox formation. The test is due to core into the Wilcox over the week end, and will penetrate the zone corresponding to the oil sections in other La Salle Parish wells.

The prospects for the Atlantic test are much enhanced by the success of the H. L. Hunt 1-A Goodpine in the Jena area. The Hunt wildcat recently encountered oil sands at 3,350-65 ft., 3,376-86 ft., 3,432-40 ft., and 3,480-90 ft., and gas sand at 3,410-32 ft. The sands correspond to those producing at Olla, lying deeper in the Wilcox than previous production. Top of the Wilcox in the Hunt wildcat is 2,484 ft. The test last week flowed 60-70 bbl. of fluid daily consisting of 55 per cent water and the operator has killed the well and squeezed off perforation points to reperforate.

In the Peterson Petroleum Corp. 1 Tremont, midway between Atlantic's wildcat and Olla proper, operators lowered tubing and rods to 2,932 ft. after pumping off at a higher level, and pumped the fluid off from the new level in 6 hours. After the hole bridged and the bridge broke, the well flowed and pumped about 75 bbl. in 8 hours and then went to salt water. It was last reported shut down awaiting orders.

In Claiborne Parish another good oil well in the Sugar Creek field is indicated from a test made on the Haynes B. Owenby 2 Ozley fee. The well encountered three oil sands in the Travis Peak formation, casing was set at 5,785 ft., and perforated at 5,766-71 ft. in the deepest oil sand. The well tested at the rate of 360 bbl. daily and was shut in. Pipe-line outlet for Sugar Creek crude is not at present available.

Elsewhere in Claiborne Parish five interesting tests are under way. In the Haynesville field Ohio Oil Co. is below 9,577 ft. headed for the Smackover formation. V. A. Hardin has topped the Gloyd in the Rodessa member of the lower Glen Rose formation at 5,100 ft. and is drilling ahead. In and near Lisbon two deep tests are under way, Union Producing 1-A Meadows drilling below 7,317 ft. north of the field, and the J. D. Caruthers, trustee, 1 Simmons unit, in the field is drilling below surface casing at 2,340 ft., to explore the Travis Peak formation.

The Logansport test of Union Producing Co. in De Soto Parish northeast of the town of Logansport and the Joaquin gas-condensate field, tried a drill-stem test in porous lime in the lower Glen Rose, which produces at Joaquin. The test failed and operators are reported attempting another over the week end. The present test, 1-B Garrett, is located northeast of the operators' 1-A Garrett drilled in Shelby County, Texas, and recently completed for an estimated potential open flow of 144,000,000 cu. ft. of gas and a spray of distillate, or condensate.

ARKANSAS

Nick Springs in Union County is gaining in attention, with the completion of a good well late this week, Root Petroleum 1 Grace, making an average of 42½ bbl. hourly with 20 per cent wash water. The will serve to increase drilling in the area.

Atlantic 2 Bodcaw Lumber Co., offset to the discovery and second test to drill in the McKamie field, Lafayette County, this week encountered 204 ft. of overall porosity in the Smackover lime and at the week's end was setting casing with total depth of 9,287 ft. The Smackover lime was topped at 9,401 ft., the first porosity at 9,051 ft., and the main porosity at 9,123 ft.

Fouke added another disappointment last week, with abandonment of Louark 4 Sturgis, further defining production on the northeast.

Estimated Daily Production

Estimated daily gross production week ended September 13:

NORTH LOUISIANA

	Bbl.
Bellevue	475
Caddo, light	5,840
Caddo, heavy	2,365
Converse	505
Cotton Valley	*13,430
Cross Lake	3,575
De Soto and Red River	1,075
Elm Grove	325
Haynesville	2,820
Holly	90
Homer	2,820
Lisbon	3,500
Olla	3,370
Pleasant Hill	90
Rodessa	18,190
Sarepta-Carterville	†305
Sligo	2,545
Sugar Creek	10
Urania	2,425
Zwolle	1,630
Total North Louisiana	65,385
Rodessa, Texas	16,750

SOUTH ARKANSAS

Atlanta	2,610
Big Creek	105
Buckner	2,755
Champagnolle	1,165
Dorcheat	1,075
El Dorado	1,640
Fouke	270
Lewisville	525
Lisbon	215
Magnolia	21,310
McKamie	310
Miller County	350
Nevada	565
Nick Springs	650
Rodessa	1,820
Schuler	18,400
Smackover, light	1,640
Smackover, heavy	13,580
Stephens	520
Troy	1,220
Urbana	1,600
Village	1,100
Total North Arkansas	73,425

*3,790 bbl. is distillate. †45 bbl. is distillate.

NORTH LOUISIANA COMPLETIONS

Caddo—Caddo Parish

James E. Kemp 1 Ober, SE SE NW 32-21-15, pumping 20 bbl., 4,000 gal. acid, T.D. 1,530 ft.
C. C. Lowery 1 Vivian Oil & Gas Co., NE NW NE 12-20-16, location abandoned.
Midfield Oil Co. 2-C Muslow, NW NE NW 5-20-15, 120 bbl., 3,000 gal. acid, T.D. 1,500 ft.
Charles Wampler 1 Newton, SE SE NE 1-20-16, pumping 35 bbl., 4,000 gal. acid, T.D. 1,530 ft.

Sugar Creek—Claiborne Parish

Haynes B. Owenby 2 L. E. Ozley fee, SW NW 33-20-5, 360 bbl., set 5½-in. casing 5,785 ft., perf. 5,766-71 ft., T.D. 5,785 ft., S.I., Travis Peak sands 5,704-08 ft., 5,750-58 ft., and 5,763-80 ft.

Wildcat—De Soto Parish

Foster & Smith 1 McRae, SE NE SW 5-12-16, abandoned, will not deepen, T.D. 100 ft.

Olla—La Salle Parish

Arkansas Fuel Oil 1 A. H. Hopkins, SE SE 24-10-2. 240 bbl., 20/64-in. choke, T.P. 155 lb., C.P. 260 lb., T.D. 2,215 ft.

Monroe—Ouachita Parish

United Carbon 1 Mulholland, 36-19-3e, 1,500,000 cu. ft. gas, R.P. 600 lb., T.D. 2,189 ft.

NORTH LOUISIANA DRILLING REPORT

Bossier Parish

H. M. Harrell et al 1 Porter, SE NW NE 20-17-11, drilling shale 3,116 ft.
L. K. McGuffin 1 Tomlinson, SW NW SE 16-18-11, S.D. 1,220 ft.
Roy L. Reese et al 1 Bellevue Land Co., SW SW NE 27-20-11, S.D. 3,035 ft.

Caddo Parish

J. M. Conner 1-A Williams, SW SE SE 3-15-15, squeezed off perf. points and reperf. 5,070-88 ft., 4,000 gal. acid, tested dry, show gas, drilled out to 5,100 ft., S.D.
R. W. Crosby 1 W. E. Glassell, NW SW NE 11-19-15, S.D. 1,290 ft.
J. M. Forgetson 1 Roberts, SE SE NW 10-22-15, D.S. test 2,687-2,707 ft., ¾-in. bottom choke, 1-in. top choke, working pressure 30 lb., flowed salt water in 13 minutes, running electrical survey, T.D. 2,809 ft.

Claiborne Parish

J. D. Caruthers, trustee 1 Simmons unit, N½ SW 2-20-5w, set 9⅝-in. casing 2,340 ft., T.D. 2,345 ft.
V. A. Hardin et al 1 Valentine, NW NW NW 31-20-6w, top Gloyd 5,100 ft., drilling shale and lime 5,423 ft.
Ohio 15 G. W. Taylor, NE SW SE 15-23-8, drilling sand and shale 9,577 ft.
Union Producing 1-A T. D. Meadows et al, NE 18-21-4, drilling 7,317 ft.
A. D. Yeary 1 J. A. Harris, SE SW SW 17-19-6, S.D. 900 ft., repair rig.

De Soto Parish

R. C. Swayles 1 Jackson, SE NW SW 36-12-14, drilling shale 610 ft.
Union Producing 1-B Mrs. M. E. Garrett, C N½ SE 33-12-16, top massive anhydrite 4,595 ft., drilling dense lime 5,013 ft.

Grant Parish

Fay Oil Co. (formerly C. M. Bowers) 1 Swope, SE SE 13-9n-1w, pulled and reset 10-in. casing 400 ft., S.D. 1,626 ft.
Peterson Petroleum Corp. 1 Swope, SE NW SE 19-9-1e, drilled out and tested salt water, S.D. 1,609 ft.

La Salle Parish

O. K. Allen, Jr., et al 1 Breedlove, SE SE NW 32-11-3e, perf. 2,214-19 ft., blew out 20,000,000 cu. ft. gas, killed well, bridged over and went dead, T.D. 2,540 ft.
Atlantic 1-B Goodpine Oil Co., NW NW 26-7-2e, set 9-in. casing 239 ft., drilling 2,367 ft.
H. L. Hunt 1-A Goodpine Oil Co., SW SW NW 10-7-3e, killed and squeezed, T.D. 3,690 ft.
Peterson Petroleum Corp. 1 Tremont Lumber Co., NE SW 25-9-2e, lowered tubing and rods 2,932 ft., pumped off in 6 hr. and bridged, bridge broke and flowed and pumped 75 bbl., 8 hr. then went to salt water, pulled tubing and rods, T.D. 4,020 ft.

Lincoln Parish

C. H. Lyons 1 Dubach Lumber Co., SW NW 30-20-3w, set 10¾-in. casing 640 ft., T.D. 730 ft.

Red River Parish

Thornton & La Croix 1 Prudential Life Insurance Co., SW SW NW 31-11-9, ran electrical survey, arranging to make D.S. test 1,317 ft.

Tensas Parish

H. L. Hunt 2 Chicago Mill & Lumber Co., SW NE 30-12-10, drilling shale 2,535 ft.

Union Parish

Tiki Exploration Co. 1 Jones, SE SE NW 30-21-3w, S.D. 3,200 ft.

NORTH LOUISIANA FIRST REPORTS

Bellevue—Bossier Parish

Shell Oil Co. 1 Ardis, SE NW NW 26-19-11.

Caddo—Caddo Parish

F. W. Bennett 2 Askew, NW SE NW 28-21-15.
J. W. Brown 1 Pitts, SW SW NE 18-21-15.
W. C. Curry 2 Spell et al, NE SW 28-21-15.
Pelham Oil Corp. 1 Bickham, NE SW NE 28-21-15.
Stanolind 1 Lane, NE SE 13-21-15.
Woodley Co., Inc., 1 Browning, SW SW NE 33-22-16.

Cotton Valley—Webster Parish

Hunt Oil Co. 2 Grant Lumber Co., NE SW 25-21-10.
Hunt Oil Co. 3 Grant Lumber Co., NE SW SW 18-21-9.

Olla—La Salle Parish

Arkansas Fuel Oil Co. 2 A. H. Hopkins, SW SW SE 24-10-2e.
Arkansas Fuel Oil 1-A T. A. Hopkins, SW NE SW 12-10-2e.
Arkansas Fuel Oil 1-A G. R. Lisenby unit, NW SE NW 12-10-2e.
Placid Oil 38 La. Central, SE NE 36-10-2.
Placid Oil 39 La. Central, NW SE 25-10-2.
Placid Oil 40 La. Central, SW SE 25-10-2.
Placid Oil 41 La. Central, NW NE 36-10-2.
Placid Oil 42 La. Central, SW NE 36-10-2.
Placid Oil 43 La. Central, SE NW 7-10-3.
Placid Oil 44 La. Central, NE NW 13-10-2.

ARKANSAS COMPLETIONS

Magnolia—Columbia County

Berkshire 1 H. C. Couch, N½ SE SE 22-17-20, 355 bbl., 12/64-in. choke, T.P. 1,300 lb., C.P. 1,400 lb., T.D. 7,700 ft.

Fouke—Miller County

Louark 4 W. P. Sturgis, NW NE SE 1-17-27, dry, T.D. 3,771 ft.

Urbana—Union County

Marine 1 G. W. Brown, NE NE NW 10-18-13, pumping 140 bbl., 3 per cent salt water, T.D. 3,531 ft.

Nick Springs—Union County

Root Petroleum 1 C. T. Grace, SW NW SE 31-17-14, 1,020 bbl., open flow, 20 per cent wash water, T.P. 400 lb., C.P. 250 lb., sand 3,743-51 ft.

ARKANSAS DRILLING REPORT

Columbia County

Louark 1 Longino et al, NW SE 10-18-10, drilling anhydrite 3,718 ft.

Dallas County

H. H. McBride et al 1 Southern Kraft Corp., SE SW 16-9-16, S.D. 1,088 ft.

Howard County

Miller & Fletcher 1 Dierks Lumber Co., SW SW 7-8s-28w, S.D. 260 ft.

Lonoke County

Lunnon Howell & Ford 1 City of Cabot, NE cor. Lot 1, Blk. 6, 18-4n-9w, S.D. 1,300 ft.
J. F. Russell 1 J. T. Gunter, SE SE SE 17-5n-10w, S.D. 2,775 ft.

Prairie County

Hazen Oil Co. 1 Fidelity Mutual Life Insurance Co., NE NE SW 16-2n-6w, S.D. 85 ft.

Saline County

Tedford Drilling Co. 1 Williams, 31-3s-15w, S.D. 390 ft.

ARKANSAS FIRST REPORTS

Wildcat—Miller County

John Coates 1 L. Ochsenbien, SE NW 19-14-27.

Nick Springs—Union County

Fohs 3 C. T. Grace, SW SE 31-17-14.

EAST TEXAS BORDER COMPLETIONS

Waskom—Harrison County

Ark. La. Gas 1 M. G. Armstrong, 1,230 ft. S, 1,280 ft. W, NE cor. 204-acre tract, S. Holloway Sur., location abandoned.

Smithland—Marion County

W. M. Blackshare 2-A Moseley, 330 ft. N, 2,850 ft. E, SW cor. W. H. Burton Sur., pumping 12 bbl., T.D. 2,371 ft.
E. D. Markham 3 Sid Hart, 1,600 ft. E, 1,220 ft. S. NW cor., G. Coore Sur., pumping 15 bbl., T.D. 2,350 ft.

EAST TEXAS BORDER DRILLING REPORT

Cass County

Max Agress 1 Clark & Boice Lumber Co., Lot 2, SW cor. 104-acre tract, B. Hawkins Sur., set 10-in. casing 116 ft., S.D. 1,760 ft.

Henry King 1 Heilborn & Kay, SW cor. D.&S.E.R.R. Sur., drilling 1,421 ft.

Panola County

Holcombe & Thomason 15 Crenshaw, 1,538 ft. S, 1,128 ft. E, NW cor. Thomas W. Cox Sur., rigging up.

Sabine County

Sterm & Womack 1 H. Kieth, SE cor. 53-acre tract, L. Grace Sur., fishing 6,173 ft.

San Augustine County

George E. Ellis et al 1 L. Sharp estate, 800 ft. SW cor. 815-acre tract, A. N. Davis Sur., moving in material.

Shelby County

W. C. Parker 1 F. G. Wiley, NE cor. 94-acre tract, A. K. English Sur., S.I., C.P. 230 lb., T.D. 3,482 ft.
P. & B. Oil Co. 2 W. C. Windham, A. K. English Sur., old T.D. 3,362 ft., P.B. to 3,360 ft., pumping 80 bbl. fluid, 10 per cent oil.
Paul Pewitt et al 1 J. S. Swann, 1,400 ft. N, 470 ft. W, SE cor. 100-ac. tract, Ann Gray Sur., T.D. 4,920 ft., shot off drill stem 3,100 ft., pulled and fishing for remainder, top Massive 4,630 ft., base Massive 4,840 ft.
Superior 3 Pickering Lumber Co., NE cor. Thomas Haley Sur., drilling shale and lime 6,630 ft.
Superior 5 Pickering Lumber Co., 5,177 ft. E, 1,907 ft. N, SW cor. Gonzales Sur., pits.

EAST TEXAS BORDER FIRST REPORTS

Wildcat—Bowie County

Lee Timberlake et al 1 J. B. Smith, 160 ft. E, 1,300 ft. S, NW cor. T. H. Hill Sur.

Smithland—Marion County

R. S. Kirby 2 Burks, 1,350 ft. S, 850 ft. W, NE cor. G. Coore Sur.
Frank Stratton 1 W. E. Elliott et al, 300 ft. S, 330 ft. E northerly NW cor. 225-acre tract, W. H. Burton Sur.

Permian Basin Fields

(Continued from Page 211)

northeast of the field, started work on a $100,000 improvement program. The refinery's capacity will be increased about 40 per cent or to 5,000 bbl. daily, following the installation of a new fractionating tower, two new boilers, a new air compressor, and improvements to the cracking unit. The date at which the program was expected to be completed was not announced.

NORTHERN WEST TEXAS COMPLETIONS

(24-hour gages)

Gaines County

Seminole field: Atlantic 3-D Riley, 586 bbl., 5,117-5,324 ft.
Magnolia & Atlantic 10-219 H.&J., 796 bbl., 5,089-5,249 ft.
Cedar Lake field: Stanolind 1 Bremont, 322 bbl., 4,645-4,790 ft.

Howard County

Wildcat: C. T. McLaughlin 1 Pete Johnson, top anhydrite 175 ft., top salt 1,035 ft., top Cowden anhydrite 1,360 ft., top Yates sand 1,540 ft., top solid lime 2,735 ft., dry at 3,573 ft.

Mitchell County

Grable-Strain area: B. R. S. Oil 1 Berry, dry at 1,801 ft.
C. L. Echols 1 Crawford, 352 bbl., 1,657-1,745 ft.

Scurry County

Sharon field: Seibert & Pierson 1 Bishop, 265 bbl., 2,210-2,435 ft.

Yoakum County

Wasson field: Aloco 8 Keller, 464 bbl., 4,945-5,197 ft.
Aloco 3 Knight, 415 bbl., 4,940-5,306 ft.
Argo Oil 7-A Comer, 1,212 bbl., 4,970-5,210 ft.
Dunigan & Brahaney 1 Shipley, 856 bbl., 5,162-5,255 ft.
Oil Development 4-765 fee, 1,346 bbl., 4,950-5,226 ft.
Shell 13-D Baumgart, 1,481 bbl., 4,890-5,157 ft.
Shell 3 Kendrick, 1,756 bbl., 4,920-5,123 ft.

DRILLING REPORT

Andrews County

Phillips 1 Embar, 60 ft. S line Sec. 31, Blk. 10, University Lands Sur., cored 4,146-58 ft., slight show oil, T.D. 4,165 ft., last report.

Dawson County

Magnolia 1 Sandidge, SE SE Sec. 22, Blk. 34, Twp. 4n, T.&P. Sur., S.S.O. 4,931-33 ft.; 4,945-50 ft.; 4,960-65 ft.; 5,040-43 ft., drilling below 5,055 ft.
Sloan & Zook 1 Sypert, SE SE Sec. 22, Blk. 34, Twp. 4n, T.&P Sur., drilling 3,895 ft.

Howard County

Shasta Oil (formerly M. L. Richards) 1 Thelma Cole, Sec. 12, Blk. 26, H.&T.C. Sur., 7-in. casing set 3,035 ft., drilling ahead at 3,215 ft.

Stonewall County

Shell 1 J. D. Patterson, SW NW Sec. 393, Blk. D, H.&T.C. Sur., Ordovician test, T.D. 5,550 ft., drill pipe stuck 3,700 ft.

Yoakum County

Sloan & Zook 1 Waples-Platter, Sec. 565, Blk. 4, Gibson Sur., top Brown lime at 4,340 ft., slight show oil 5,240-60 ft., swabbed and flowed 167 B.O. in 24 hrs., S.D.

TEXAS PANHANDLE

AMARILLO, Tex., Sept. 16.—There were only four oil wells and one gas well completed in the Panhandle fields during the past week, this being a considerable drop from the previous week's total of eight oil wells and three gas wells.

In Cottle County, Ramsey Petroleum Corp. was preparing to start its projected 5,000-ft. wildcat on the Lynch Brothers ranch in Section 66, J. Potevant Survey.

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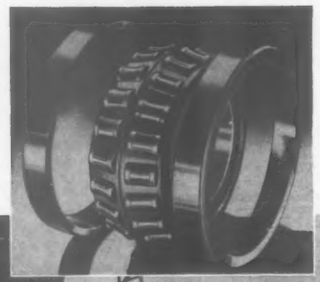

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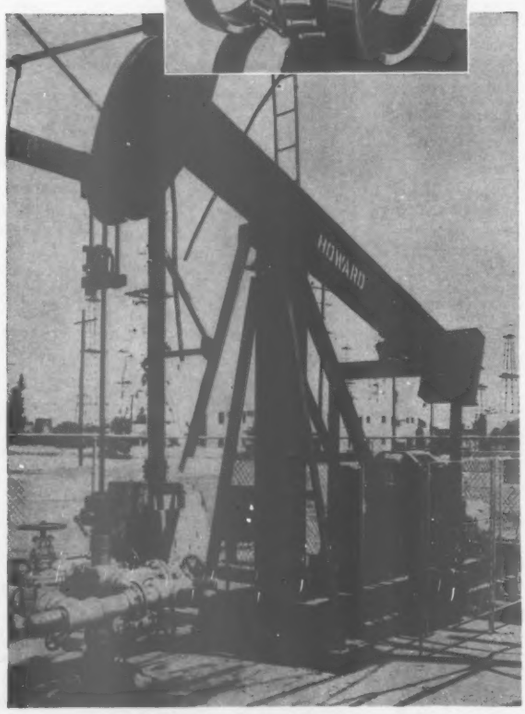

Howard DC-10 Twin Crank Pumping Unit equipped with Shafer pillow block upper pitman bearing, Shafer special crank pin lower pitman bearings.

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Radial-thrust
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CONCAVEX

The location is about 8 miles southwest of Paducah.

New locations for the week in the Panhandle district included two each in Gray, Carson and Hutchinson counties for a total of only six.

TEXAS PANHANDLE COMPLETIONS

(24-hour gages)

Carson County

Danciger Oil 7 Moore-Langdon, 133 bbl., 3,047-90 ft.
Texoma 8-S Schafer, 22,300,000 cu. ft. gas, 2,398-2,620 ft.

Hutchinson County

J. M. Huber 1 Bryan, 196 bbl., 3,185-3,210 ft.

Wheeler County

Amsman 4 Jackson, 122 bbl., 2,182-93 ft.
Budco Oil 2 Walker, 43 bbl., 2,438-2,512 ft.

DRILLING REPORT

Childress County

Texas 1 P. B. Smith, NW NW Sec. 97, Blk. 9, H.&G.N. Sur., 7,500-ft. contract, drilling below 5,450 ft.

Cottle County

Ramsey Pet. 1 Lynch, SE SW Sec. 66, J. Poitevent Sur., 5,000-ft. test, location.

Motley County

Humble 1 Matador, Sec. 29, Blk. J, B.S.B.&C.N.G. Sur., drilling below 3,250 ft.

Swisher County

Krupp-Flaherty 1 Kleen, Sec. 120, Blk. 10-M, 6,500-ft. test, top salt 1,020 ft., drilling below 1,600 ft.

SOUTHEAST NEW MEXICO

HOBBS, N. M., Sept. 16.—Sierra County, in the southern part of New Mexico, was given a new wildcat location during the week. It is to be Clyde R. Wofford and associates 1 Graham-State, located 660 ft. from the south and west lines of 8-14s-2w, about 8 miles east and slightly south of Elephant Butte.

Eddy County's closely watched deep wildcat, Venture Oil 1 Lowe, shut down for orders last week at its contracted depth of 6,000 ft., is being readied for deepening. It is located in the SW SE 26-13s-37e. The test is reported to have checked structurally high, however, no promising zones of saturation were drilled in going to its present depth of 6,000 ft. How much deeper the new contract will carry the test was not reported.

SOUTHEAST NEW MEXICO COMPLETIONS

Eddy County

Root field: C. L. East 6 Root ..... SW SE 12-17-29
Flowed 90 bbl., T.D. 2,613 ft.
Fulton & Folkner 7 Anderson ..... SW NE 12-17-29
Flowed 110 bbl., T.D. 2,665 ft.
Mac T. Anderson 5 Root ..... SE SE 1-17-29
Flowed 65 bbl., T.D. 3,434 ft.

Lea County

Arrowhead field: Continental 10-J-2 State ..... SW SE 26-13-37
Flowed 102 bbl. per hour for 3 hr., T.D. 3,830 ft. in lime.
Maljamar field: Cockburn 21-B Baish ..... SW NE 28-17-32
Flowed 400 bbl., shot 3,750-3,806 ft.
West Eunice field: Wilson Oil 6 Shell-State ..... SW NW 18-17-35
Dry, T.D. 3,895 ft., sulfur-water lime.

SOUTHEAST NEW MEXICO DRILLING REPORT

Chaves County

Roxana 1 Franks ..... NW NW 17-9s-25e
16 mi. NE of Roswell, location.
Roxana 1 Maull ..... NE NW 11-12s-25e
Material on ground.
H. Steinberger 1 Headley ..... NW SW 26-14s-29e
Rigging up cable tools.
Martin 1 Stephens ..... NW NE 22-15-29
Old failure drilling deeper, S.D. 2,340 ft.

Dona Ana County

Armstrong 1 Baker ..... NW SW 4-23-1
S.D., casing 40 ft.

Eddy County

Dooley & Haynes 1 Martin ..... SE NW 9-18-25
Drilling 490 ft.
Knox & Featherstone 1 Hatchett ..... SW NE 14-20-26
Spudding.
Beddingfield & Walker 1 Seale ..... SE SE 10-20-27
S.D. 969 ft.
Talmadge 1 State ..... SW NE 24-16-28
Slight show oil 2,505-15 ft., S.D.O. 2,605 ft.
Jones & Yates 1 Everest ..... NE SE 15-18-26
Drilling 800 ft.
Trojan 1 Grant ..... SW NE 33-20-25
Reaming casing to 1,500 ft.
Shumacher 1 Levers ..... NE NE 33-16-29
S.I. 2,875 ft.
M. Yates 1 Williams ..... NE NW 25-18-26
Location.
Black & Ratliff 1 Simmons ..... SE NW 9-21-25
Drilling 685 ft.
A. & M. Petroleum 2 State ..... NW SE 15-21-17
S.D. 350 ft.
Clark & LaNeve 1 Boulter ..... SE NW 28-19-27
Prepare to spud.

Lea County

Stanley & Weiner 1 Saunders ..... NE NE 20-21-38
Drilling 3,035 ft.
Venture Oil 1 Lowe ..... SW SE 26-13s-37e
6,000-ft. test, T.D. 6,000 ft., preparing to drill deeper.
Great Western Prod. 1-D State ..... SE SE 30-12-32
Slight show oil and salt water from 3,022-32 ft., T.D. 3,052 ft., 1,500 ft. oil in hole, preparing to test.

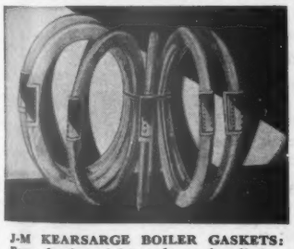
Otero County

R. H. Ernest 1 Located Land Co. ..... SE SE 20-25-7
S.D. 3,729 ft.

Sierra County

Clyde R. Wofford 1 Graham-State .... SW SW 8-14s-2w
First report.

KEEPING 'EM ROLLING — By WESTCOTT



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Discoveries on Increase in Active Wildcat Play

By

STAFF CORRESPONDENT

MATTOON, Ill., Sept. 16.—Activity in Illinois declined from that of previous weeks but on the whole drilling was more than usually successful. Out of 68 completions, 56 were producers and 12 were dry holes. Activity continues to decline in the old fields with no completions at Centralia, 6 at Louden, including a dry hole, and 13 in Salem. Of the Salem producers, six were in the Devonian and seven in the McClosky-Salem pays. Ten wells were started in Salem and there were 59 drilling. At Louden there were 6 new locations and 26 drilling wells.

The Womack pool in Bond County continues active with five completions, three new wells and four drilling. Wildcatting is also on the increase with 19 first reports as against 9 completed.

The best wildcat completion was Conner & Arnold 1 Swick, SE SE NE 17-6n-10e, in Jasper County. This well flowed 746 bbl. through 14/64-in. choke from the McClosky and makes the second pool opener in that county within 2 weeks. Last week Johnson 1 Mendenhall was reported successfully completed just 12 miles north of 1 Swick.

In Clay County Lagall 1 Huffman, W½ SW NW 20-4n-6e, found porous McClosky at 2,852-56 ft., but got no production and is drilling ahead in the St. Louis limestone at 2,917 ft. Effingham County's two productive wildcats are still not officially reported as completions as they are testing. Erwin & Barr 1 Dammerman, NW NW SW 18-8n-4e, reports 350 ft. of oil in the hole from the Cypress at 1,554 ft., which cannot be lowered with the bailer. R. H. Troop 1 LeCrone, NW NW SW 7-8n-4e, reports 300 ft. of fluid in the hole, also from Cypress at 1,549-58 ft. Successful completion of these wells will give Effingham County its first production. Eventually they may prove to be an extension to the Louden field which lies immediately west of the two wells.

Carter Oil Co. has opened a new pool near the White-Gallatin county line and south of the Storms pool with its 1 Dagley which pumped 60 bbl. after a 10-qt. shot from a shallow sand at 1,504-07 ft. Location is NW NW NE 11-7s-9e.

ILLINOIS COMPLETIONS

Bond County

Barkley 1 Thompson . . . . . NW NE NE 2-4n-4w
Abandoned location.

Magnolia J. Elam . . . . . SE SW SW 3-6n-2w
Pumped 98 bbl. oil and 9 bbl. water, 10 and 20-qt. shots, Benoist 1,011-24 ft.

Magnolia 2 W. H. Grigg . . . . . SE NE NE 9-6n-2w
Pumped 49 bbl. oil and 2 bbl. water, 10-qt. shot, Benoist 1,017-26 ft.

National Petrol. 7 Spindler Inv. SW NW NW 10-6n-2w
Pumped 98 bbl., 10 and 40-qt. shot 1,006-23 ft.

Spindler Inv. 2 fee . . . . . SW NE NW 10-6n-2w
Pumped 70 bbl. oil and 1 bbl. water, 40-qt. shot 1,006-12 ft.

Arrow Drlg. 1 Spindler Inv. . CNL SW NW 10-6n-2w
Pumped 54 bbl., Benoist 1,010-18 ft., P.B. to 1,015 ft.

Clinton County

B. E. Martin 1 Heinzman . . . . . N½ N½ NW 16-2n-1w
Dry, Glen Dean 997 ft., water in Cypress, Benoist shaly, T.D. 1,470 ft.

D. Duncan 6 Knolhoff . . . . . NW NW NW 11-1n-2w
Dry, old T.D. 1,350 ft., Fredonia 1,486 ft., T.D. 1,522 ft., P.B. to 1,212 ft.

Max Pray 1 H. Brameier . . . . . SE SW SW 2-1n-2w
Pumped 25 bbl. oil and 3 bbl. water, 3-qt. shot, Benoist 1,316-21 ft.

D. Duncan 7 Knolhoff . . . . . SE NW NW 11-1n-2w
Pumped 50 bbl. oil and 6 bbl. water, 3-qt. shot, Benoist 1,318-24 ft.

M. Jacobson 3 Knolhoff . . . . . NE SE NW 11-1n-2w
Pumped 40 bbl., 1-qt. shot, Benoist 1,322-23 ft.

P. Mosebach 3 Maddux . . . . . SE SW SW 4-1n-3w
Pumped 192 bbl., 4,000 gal. acid, Devonian 2,378-2,412 ft.

Newton & Ward 2 D. F. Greene . NE SE SW 5-1n-3w
Dry, Cypress 985-1,003 ft., T.D. 1,361 ft.

P. Mosebach 4 B. Maddux . . . . . NW SW SW 4-1n-3w
Pumped 75 bbl., Devonian 2,393 ft., pay 2,395 ft., T.D. 2,414 ft., P.B. to 2,410 ft.

Douglas County

A. J. Broadus 1 Bennett . . . . . SW SW SW 12-15n-9e
Dry in Pennsylvanian 615 ft.

Fayette County—Louden Field

Carter 1 Cora Smith . . . . . SW NW SE 35-9n-3e
Pumped 10 bbl., 60-qt. shot, Cypress 1,508-40 ft.

Carter 2 W. E. Phillips . . . . . NE NW NW 1-8n-3e
Pumped 126 bbl., 30-qt. shot, Cypress 1,538-61 ft.

Carter 3 W. Gregg . . . . . NE NW SE 13-8n-3e
Pumped 144 bbl., 5-qt. shot, Cypress 1,523-27 ft.

Carter 3 M. Latimer . . . . . SW NW NW 21-8n-3e
Pumped 264 bbl., 40-qt. shot 1,554-70 ft., Cypress 1,490-98 ft., Paint Creek stray 1,541-79 ft., T.D. 1,581 ft.

J. C. Reynolds 1 Bieber . . . . . NW SW NE 19-8n-3e
Dry, T.D. 1,660 ft.

Carter 6 G. R. Owen . . . . . NW NE NW 17-7n-3e
Pumped 108 bbl., 15 and 15-qt. shots, Cypress 1,481 ft., Paint Creek stray 1,552-76 ft., T.D. 1,590 ft.

Shell 1 Fulton . . . . . NE NW NW 28-7n-3e
Water-disposal well, 15-qt. shot 1,400-10 ft., input 50 bbl. per hr.

Fayette County

Zephyr Drlg. 1 Stevens . . . . . NW SW SE 31-6n-3e
Pumped 48 bbl. in 8 hr., 7-qt. shot, top Cypress 1,616 ft., T.D. 1,630 ft.

Hamilton County

Howell 1 Sandusky . . . . . SW NW NE 34-5s-6e
Pumped 264 bbl., Benoist 2,994-3,000 ft.

Kingwood 5 Wilson . . . . . NE NW SE 6-6s-7e
Abandoned location.

Ohio 4 F. R. Wilson . . . . . NW NW NE 6-6s-7e
Abandoned location.

Jasper County

Conner & Arnold 1 J. H. Swick SE SE NE 17-6n-10e
Flowed 746 bbl., 14/64-in. choke, top Fredonia 2,776 ft., top pay 2,780 ft., T.D. 2,819½ ft.

Jefferson County

Young 1 Whittington . . . . . SE SE SW 30-4s-3e
Dry, elev. 414 ft., Ste. Genevieve 2,818 ft., St. Louis 2,984 ft., Salem 3,210 ft., T.D. 3,230 ft., P.B. to 2,661 ft. to test Paint Creek stray 2,650-65 ft.

Lawrence County

W. Payne 1 Monjar . . . . . SW NE NW 28-4n-11w
Dry, elev. 415 ft., Buchanan sand 1,206-26 ft., Cypress sand 1,536-73 ft., Aux Vases 1,695 ft., Ste. Genevieve 1,722 ft., McClosky 1,766-68 ft., T.D. 1,964 ft.

Robinson 1 Schrader . . . . . SW NE NW 33-3n-12w
Flowed 58 bbl. oil and 68 bbl. water, 1,000 gal. acid, McClosky 2,097 ft., T.D. 2,141 ft.

Marion County

Kingwood 1 H. V. Spencer . . . . . NW NW SW 19-3n-3e
Dry, Devonian 3,832 ft., perf. 2,750-76 ft., in Salem, slight show, T.D. 3,957 ft., P.B. to 2,776 ft.

Big Four 3 Dean . . . . . SW SW SW 4-2n-1e
Pumped 250 bbl., 100 gal. acid, Devonian 2,969-70½ ft.

W. K. Jones 1 I.C.R.R. . . . . NE SE SW 5-2n-1e
Dry, Menard 1,040 ft., Cypress sand 1,430 ft., Aux Vases 1,610 ft., Ste. Genevieve 1,660 ft., St. Louis 1,770 ft., Salem 1,870 ft., Devonian 2,976 ft., T.D. 3,033 ft.

Marion County—Salem Field

Texas 9 J. E. Hamlin . . . . . SW NW NE 4-2n-2e
Pumped 80 bbl., 3,000 gal. acid, McClosky 2,128-42 ft.

Texas 9 D. Buckley . . . . . S½ NW SE 33-2n-2e
Pumped 150 bbl., 5,000 gal. acid, Devonian 3,515 and 3,536-38 ft.

Texas 73 City of Centralia . . . . . SE SE SW 33-2n-2e
Pumped 175 bbl. oil and 25 bbl. water, 5,000 gal. acid, Devonian 3,510 and 3,516 ft., T.D. 3,525 ft.

Texas 59 City of Centralia . . . . . W½ NW NW 4-1n-2e
Flowed 210 bbl., 5,000 gal. acid, Devonian 3,471-3,505 ft.

Texas 15 E. Farthing-C . . . . . NE SW NE 4-1n-2e
Pumped 34 bbl. oil and 30 bbl. water, McClosky 2,105-10 ft., St. Louis 2,309 ft., 10-qt. shot and 2,000 gal. acid, T.D. 2,551 ft., P.B. to 2,124 ft.

Texas 69 City of Centralia . . . . . SW NW NE 5-1n-2e
Pumped 270 bbl., 4,500 gal. acid, McClosky 1,910-37 ft. and 1,960-70 ft., Salem 2,141-50 ft. and 2,172-84 ft., T.D. 2,190 ft.

Texas 71 City of Centralia . . . . . SE NW NE 5-1n-2e
Pumped 245 bbl., 4,500 gal. acid, McClosky 1,968-80 ft. and 2,010-15 ft.. Salem 2,183-2,200 ft., T.D. 2,215 ft.

Texas 74 City of Centralia . . . . . SE SW SE 5-1n-2e
Flowed 305 bbl., 5,000 gal. acid, Devonian 3,410-47 ft., T.D. 3,497 ft.

Texas 23 J. Cannull . . . . . NW NE NE 6-1n-2e
Pumped 189 bbl., 3,500 gal. acid, McClosky 1,891-1,900 ft. and 1,915-30 ft., Salem 2,142-45 ft., T.D. 2,210 ft.

Texas 29 O. Johnson . . . . . NW SE SE 6-1n-2e
Pumped 205 bbl., McClosky 1,910-30 ft., 1,935-40 ft., and 1,963-68 ft., Salem 2,146-60 ft., T.D. 2,160 ft.

Ohio 18 R. Murray . . . . . SE NW SE 7-1n-2e
Pumped 1,344 bbl., 5,000 gal. acid, Devonian 3,456-63 ft., T.D. 3,500 ft.

Rockhill 19 Soster . . . . . NW SE SE 7-1n-2e
Flowed 850 bbl., 5,000 gal. acid, Devonian 3,495-3,505 ft.

Texas 20 Friedrich B . . . . . S½ NE NE 8-1n-2e
Pumped 20 bbl., 3,000 gal. acid, McClosky 2,020-26 ft., 2,036-46 ft., and 2,059-63 ft., Salem 2,248 ft., T.D. 2,265 ft.

McDonough County

Bruninga 1 fee . . . . . SW NW NE 8-6n-3w
Dry, T.D. 628 ft.

Montgomery County

C. Ewing 1 Waggoner . . . . . SW SE SW 29-11n-5w
Pumped 5 bbl. oil and 20 bbl. water, 25-qt. shot 573-78 ft., Ste. Genevieve 535 ft., T.D. 650 ft.

Ray Brown 1 Witt . . . . . NW SE SE 30-11n-5w
Dry, sand 628-35 ft., T.D. 650 ft.

Wabash County

Finley 1 H. Smith . . . . . NW NW SW 3-1n-13w
Pumped 60 bbl. oil and 6 bbl. water, McClosky 2,692-96 ft., T.D. 2,732 ft.

Longhorn 13 Hell . . . . . NW SW SW 7-3s-13w
Pumped 10 bbl. oil and 40 bbl. water, sand 1,243-51 ft., T.D. 1,253 ft., P.B. to 1,251 ft.

Wayne County

Pure 1 Gill . . . . . NW SW NE 5-1n-8e
Pumped 76 bbl., 5,000 gal. acid, McClosky 3,037-42 ft., T.D. 3,110 ft.

Pure 2 Powell Hubble Cons. . . . . E½ NE SE 5-1n-8e
Flowed 308 bbl., 5,000 gal. acid, McClosky 3,122-27 ft., T.D. 3,140 ft.

Weinert 3 Cormick . . . . . SE NW SW 4-2s-7e
Pumped and flowed 48 bbl., McClosky 3,281-96 ft., T.D. 3,303 ft.

Weinert 9 McPherson . . . . . E½ SW NE 4-2s-7e
Pumped 125 bbl. oil and 200 bbl. water, 5,000 gal. acid, McClosky 3,246-54 ft., T.D. 3,297 ft., P.B. to 3,259 ft.

Weinert 2 Sieninger . . . . . E½ NW NE 9-2s-7e
Flowed 116 bbl. in 18 hr., died, pumped 206 bbl., McClosky 3,237-42 ft., T.D. 3,271 ft.

Bell 2 Hern . . . . . NE NW NE 3-2s-7e
Abandoned location.

Pure 4 J. W. Hubble-A . . . . . E½ NW NW 33-2n-8e
Dry, McClosky 3,006-99 ft.

Pure 1 Broyles Consol. . . . . W½ NW SW 3-2n-8e
Pumped 212 bbl., 5,000 gal. acid, McClosky 2,970 ft., T.D. 3,070 ft.

Pure 1 E. W. Anderson . . . . . W½ NW NE 24-2n-7e
Pumped 56 bbl. oil and 11 bbl. water, 5,000 gal. acid, McClosky 3,050-52 ft. and 3,055-60 ft., T.D. 3,090 ft.

Pure 2 E. Behymer . . . . . S½ SE SE 33-2n-8e
Flowed 228 bbl., 1,000 and 5,000 gal. acid, Fredonia 3,034 ft.. T.D. 3,105 ft.

Edwards County

Superior 2 Works . . . . . NW NE SW 18-2n-11e
Flowed 600 bbl. (est.), McClosky 3,071-80 ft., T.D. 3,087 ft.

White County

Cherry & Kidd 2 W. W. Gray . . SE SE SE 8-4s-14w
Pumped 81 bbl., 10-qt. shot, Benoist 2,666-68 ft. and 2,696-2,705 ft., T.D. 2,718 ft.

Pure 3 Potter . . . . . SW SW NW 9-4s-14w
Pumped 63 bbl., pay 2,682-93 ft., T.D. 2,700 ft.

Superior 5 Fitten . . . . . SW SE SE 27-4s-14w
Flowed 474 bbl., ¼-in. choke, McClosky 2,886-92 ft., T.D. 2,906 ft.

Wiser 1 Hulett . . . . . SW SW SE 23-6s-8e
Flowed 1,040 bbl., 5,000 gal. acid, McClosky 3,059-89 ft., T.D. 3,170 ft.

Exchange-Ohio 4 S. A. Pearce . . SW NE SE 11-6s-9e
Swabbed 86 bbl., 10-qt. shot, Waltersburg 2,263-76 ft.

Eason & Angle 11 Storms . . . . . NW SW SE 14-6s-9e
Flowed 100 bbl., 15-qt. shot, Waltersburg 2,249-69 ft.

Eason 5 N. Storms . . . . . NE SW SE 15-6s-9e
Flowed 55 bbl., 15-qt. shot, Waltersburg 2,243-58 ft.

Eason 2 Powell . . . . . SW NW NE 22-6s-9e
Pumped and flowed 85 bbl., 10-qt. shot 2,252-67 ft.

Exchange 4 Angle-Storms . . . . . SE NE NE 22-6s-9e
Pumped 46 bbl., 10-qt. shot 2,242-63 ft.

H. Blackstock 1-B N. Storms . . . SE NE NE 23-6s-9e
Flowed 133 bbl., natural, Waltersburg 2,253-64 ft.

Exchange-Ohio 10 A. J. Rudolph NE NW SW 12-6s-9e
Dry, Waltersburg 2,266 ft., sand 2,293 ft., T.D. 2,305 ft.

Carter 1 R. G. Dagley . . . . . NW NW NE 11-7s-9e
Pumped 60 bbl., 10-qt. shot 1,504-07 ft., T.D. 1,516 ft.

ILLINOIS DRILLING REPORT

Bond County

Kingwood 1 Gaffney . . . . . SW SE SE 30-6n-3w
Rig, first report.

Haines & Jackson 1 Hunter . . . . . SW SE SW 1-4n-4w
S.D. 120 ft., first report.

G. Brainard 1 Lindley . . . . . NE NE SE 26-6n-4w
Drilling 300 ft., first report.

Central States 1 Rich . . . . . NW SE NW 28-6n-4w
Moving in, first report.

Miller 1 McCarlo . . . . . SW NW SW 27-7n-4w
12-in. 20 ft., 10-in. 105 ft., drilling 350 ft.

Clark County

Snavely 1 Schofield . . . . . SE NE SE 6-11n-11w
Trenton 3,272 ft., drilling 3,913 ft.

Clinton County

Kistler & Strawser 1 Barry . . . . . SE SW NW 22-1n-1w
Drilling 1,145 ft.

Clay County

Lagall 1 Huffman . . . . . W½ SW NW 20-4n-6e
Ste. Genevieve 2,755 ft., St. Louis 2,917 ft., porosity 2,852-56 ft., S.D. 2,926 ft.

Effingham County

Erwin & Barr 1 Dammerman . . . . NW NW SW 18-8n-4e
Cypress sand 1,554 ft., 350 ft. oil in hole, could not bail down, set 4½-in. 1,480 ft.

R. H. Troop 1 LeCrone . . . . . NW NW SW 7-8n-4e
Sand 1,549-58 ft., 300 ft. fluid in hole.

Fayette County

Turner 1 Pruett . . . . . SE SW NW 7-5n-3e
Drilling 1,395 ft.

Williams et al 1 Sather . . . . . SW SE SW 16-7n-3e
P.B. to 1,535 ft., Cypress 1,514 ft., deepened to 1,545 ft., shot 15 and 30 qt., cleaning out.

Glenwood 1 Gen. Amer. Life . . . . . NW SE NW 10-5n-4w
Menard 1,735 ft., Tar Springs 1,855 ft., Glen Dean 1,933 ft., S.D. 1,937 ft.

Green 1 McDonald . . . . . NW NE NW 23-7n-1w
Glen Dean 1,345 ft., S.D. 1,445 ft.

Forest 1 Payne .....NW NE NW 27-4n-1w
Cypress 1,281 ft., Paint Creek 1,315 ft., Benoist 1,414 ft., H.F.W. 1,428-32 ft., T.D. 1,465 ft.
L. Grandstaff 1 Severns .....NW SE NW 18-6n-3e
Golconda 1,482 ft., Cypress sand 1,620 ft., S.D.

Ford County

Nelson et al 1 Erp .....SW NW SE 19-24n-7e
Devonian 800 ft., S.D. 1,965 ft.

Gallatin County

Egyptian Tie & Timber 2 fee....SE NE SW 16-8s-10w
Ste. Genevieve 2,030 ft., S.D. 2,047 ft.

Greene County

Scroggins 1 McVay .....SW NE 4-10n-11w
Drilling 157 ft., first report.

Jasper County

Johnson 1 Hunt .....E½ SE NE 17-8n-10e
Glen Dean 2,074 ft., T.D. 2,444 ft.

Jersey County

Hughes Pet. 1 Kollall .....SE SE NE 22-8n-12w
Drilling 745 ft.

Montgomery County

Solomon 1 Carroll .....NE SE NE 3-8n-5e
Show oil and water 673-75 ft., S.D. 677 ft.
H. C. Detrich 1 W. H. Barnes....NW NE SE 20-10n-2w
Location, first report.
J. W. Branson 1 Woods .....SE SE NW 5-10n-5w
S.D. 300 ft.
C. W. Miller 1 F. Alford .....NE NW NW 6-10n-5w
S.D. 687 ft.
Thorpe & Grant 2 B. Woods..SW NW NW 32-11n-11w
Drilling 305 ft.

St. Clair County

Harris et al 1 City Park .....NW SE 34-2n-9w
Drilling 1,575 ft.

Schuyler County

D. A. Reed 1 B. Applegate .....NW SW NE 9-3n-2e
Drilling 960 ft.

Saline County

Potter et al 1 Thaxton .....E½ NW SW 28-8s-7e
S.D. 2,220 ft.
Parker & Son 1 fee .....NW SW SE 8-10s-5e
Drilling 3,690 ft.

Tazewell County

Bartelmay 1 Mathis .....SW NW SW 24-26n-5w
S.D. 806 ft.
W. E. Adams 1 Mullinex .....SE SE SW 15-22n-5w
10-in. 153 ft., 8-in. 179 ft., 6-in. 220 ft., drilling 300 ft.

Wabash County

F. Tatum et al 1 Ed. Alka .....NE SW SW 34-1s-13w
McClosky 2,638-45 ft., swabbed and flowed 30 bbl., testing, T.D. 2,656 ft.
Hayes et al 1 Gunfel .....SE NE 9-1n-13w
Location, first report.

Washington County

Hubbard 1 Hunleth .....SW SW NE 30-3s-4w
Glen Dean 667 ft., Benoist 1,583 ft., drilling 1,595 ft.
Cairo Union 1 Chaney .....NW NW SW 23-3s-4e
Glen Dean 2,450 ft., drilling 2,510 ft.

White County

W. C. McBride 1 F. Hau .....SW SE SW 33-3s-14w
10-in. 195 ft., drilling 972 ft.
Mazda & Palmer 1 Lee Storms....N½ SW SE 26-5s-9e
Show oil, Fredonia 3,153-63 ft., T.D. 3,167 ft.
Arrow Drlg. 1 J. C. Hau .....SE NE NE 5-4s-14w
10-in. 203 ft., drilling 762 ft.
Sitesinger 1 Miller .....W½ SE NE 8-7s-10e
Drilling 120 ft., first report.
Carter 1 B. Questell .....SW NW SE 2-7s-9e
Questell sand 1,756 ft., swabbed 14 bbl. oil and 7 bbl. water in 3 hr., Menard 2,207 ft., Waltersburg 2,287 ft., Tar Springs 2,354 ft., drilling 2,362 ft.
Carter 1 E. A. Green .....SE NE NW 2-7s-9e
Rigging up, first report.
Carter 1 H. Questell .....NW NE SW 2-7s-9e
Moving in, first report.

DeKalb County

J. E. Milburn 1 Eraas .....NE NW SE 22-38n-3e
S.D. 520 ft., lost circulation.

North Goldsmith Field

About 3 miles northwest of the Goldsmith field in Ector County, West Texas, an area is steadily developing into one of considerable importance. It is the North Goldsmith field, so named several weeks ago by the Texas Railroad Commission. The original discovery well in the field was Grisham-Hunter 1 Cowden, NW SW Section 10, Block 45, Township 2n, T.&P. Survey, completed early in September of 1936 for a daily potential of 33 bbl.

During the widespread exploratory drilling program last year in Ector County projected to the deep Holt horizon, Grisham-Hunter started their No. 1 Cummins-Cole, about ½ mile south of the old discovery well and located in the NE NE Section 4, Block 45, Township 1n, T.&P. Survey. A good show of oil was found in the regular Permian lime pay of the old discovery; however, the well was carried deeper to the 5,200-ft. Holt horizon. No production was found at the deep level and the hole was plugged back and completed for a producer from the 4,400-ft. pay.

With prospects then seen for developing the area into an oil field, the operators cleaned out the old 1 Cowden, shot it with 890 qt., and recompleted it for 100 bbl. of oil and 12 bbl. of water, pumping, in 12 hours. New locations were then made by the discovery operators and by Magnolia Petroleum Co. which held a 160-acre lease immediately to the north. At present there is one well in the completion stages, one well drilling, and two locations staked.

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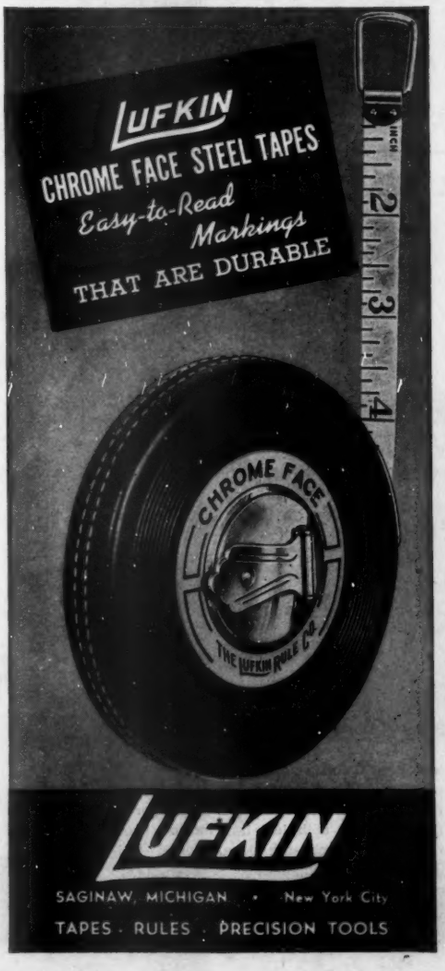

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PIPELINE CONTRACTORS

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TULSA, OKLAHOMA

Texas Gulf Coast

(Continued from Page 208)

mented following an electrical survey. Top of the Wilcox was tentatively established at 8,250 ft. and sand and shale with a brackish taste was cored at intervals from 8,277-8,400 ft. Location is in the William Hays Survey, about 3 miles south of Shepherd.

TEXAS GULF COAST COMPLETIONS

Austin County

Wildcat: John Mayo et al 1 Bollman, top Wilcox 6,810 ft., dry, T.D. 7,241 ft.

Brazoria County

Old Ocean field: Stanolind 1 Chenault & Smith, 276 bbl., ¼-in. choke, T.D. 10,780 ft.

Fort Bend County

Thompson field: Gulf 3 Scanlan, 844 bbl., ¼-in. choke, top sand 7,892 ft., T.D. 7,904 ft.
Gulf 18-B Wolters, 43 bbl., ¼-in. choke, perf. casing 5,408-23 ft., T.D. 5,445 ft.

Galveston County

Dickinson field: Humble 10 Fream, dry, T.D. 8,670 ft.
League City field: Phillips 8 Wilson, 244 bbl., ⅛-in. choke, perf. casing 8,688-92 ft., T.D. 8,745 ft.

Harris County

Clear Lake field: Humble 50-C West, dry 5,983 ft.
Tomball field: Humble 8 Reid, gas well, 5,572 ft.

Jackson County

Lolita field: Humble 3-A L. Ranch, 328 bbl., ¼-in. choke, perf. casing 5,925-29 ft., T.D. 5,959 ft.
Magnolia 2 Four Way Ranch, 268 bbl., ⅛-in. choke, perf. casing 6,396-98 ft., T.D. 6,399 ft.
West Ranch field: Humble 9 Toney, 395 bbl., ¼-in. choke, top sand 5,526 ft., T.D. 5,540 ft.
Seaport 1 Davis, dry 6,050 ft.

Jefferson County

La Belle field: Sun 7 Broussard-Hebert, 750 bbl., ¼-in. choke, perf. casing 7,264-71 ft., T.D. 7,475 ft.

Liberty County

Hull field: D. & L. Production Co. 3 Piveto, 248 bbl., pumping, top sand 5,790 ft., T.D. 5,400 ft.
Wildcat: John Mayo 1 R. D. McDonald, dry, 6,256 ft.

Matagorda County

Van Vleck field: Skelly 6 Rugeley, 311 bbl., 5/32-in. choke, perf. casing 8,498-8,500 ft., T.D. 8,507 ft.

Polk County

Segno field: Humble 27-B Kirby Lumber Co., 408 bbl., ¼-in. choke, T.D. 8,185 ft.

Tyler County

Joe's Lake field: Republic 41 fee, 425 bbl., ¼-in. choke, top sand 7,645 ft., T.D. 7,700 ft.
Wildcat: Lewis Franklin 1 Schlicher-Thomas, dry 4,722 ft.

Wharton County

Hillje field: Texas 2 Haggard, 82 bbl., ⅛-in. choke, top sand 5,212 ft., T.D. 5,240 ft.
Pickett Ridge field: Texas 41-A Pierce, 42 bbl., 5/64-in. choke, perf. casing 4,700-04 ft., T.D. 4,818 ft.
Withers field: Humble 25 Cockburn, 372 bbl., ¼-in. choke, top sand 5,539 ft., T.D. 5,541 ft.
Texas 77-C Pierce, 120 bbl., ⅛-in. choke, T.D. 5,385 ft.
Texas 78-C Pierce, 115 bbl., ⅛-in. choke, perf. casing 5,310-61 ft., T.D. 5,309 ft.

Wildcat: J. B. Ferguson 1 Damon, dry, 6,025 ft.

TEXAS GULF COAST DRILLING REPORT

Austin County

Humble 17 Hardy, deep test Raccoon Bend field, drilling shale 6,755 ft.
Humble 17-Y Woodley, deep test Raccoon Bend field, drilling sand 8,046 ft.

Brazoria County

Gulf Board 1 K. A. Millburn, A. G. Reynolds Survey, first report, location.

Chambers County

Humble 2-A-246 State, Galveston Bay, 7-in. casing 9,285 ft., coring sandy shale 9,365 ft.
Humble 3-A-248 State, Galveston Bay, driving piling.
Humble 1-C-45 State, Galveston Bay, coring sandy shale 8,095 ft.
Humble 1-B-288 State, Galveston Bay, T.D. 9,044 ft., fishing.
Shell 1-199 State, Galveston Bay, driving piling.
Standard of Texas 1-66 State, Galveston Bay, coring shale 9,055 ft.

Fort Bend County

Titanic 1 Mozola, north of Orchard field, Sarah Kennedy Survey, rigging up.

Galveston County

Continental 1 W. S. Davis, M. Muldoon Survey, drilling shale 8,305 ft.
Stanolind 2 Hulen, Alta Loma field, T.D. 11,117 ft., P.B., T.D. 9,954 ft., prepare to test.
Texas 1-237 State, Galveston Bay, drilling shale and lime 6,412 ft.

Jackson County

Pure 1 Spacek, SW of Ganado, drilling shale 3,574 ft.

Jefferson County

British American 1-72 State, Gulf of Mexico, drilling shale and lime 6,970 ft.
British American 1-71 State, Gulf of Mexico, driving piling.
Hebert & Smith 1 M. F. Young, SW of West Beaumont field, A. Houston Survey, T.D. 5,276 ft., running electrical survey.

Liberty County

Gulf 1 Phoenix Development Co., deep test SE flank Hull field, drilling shale 7,405 ft.

Matagorda County

Pan American 1 Sisk, S flank test, Markham dome. T.D. 4,602 ft., fishing.

Rocky Mountain Area

(Continued from Page 215)

MONTANA

Big Horn County

Dr. Crosby 1 Pat. land ..... SE SE NE 16-1s-13e
Resumed at 1,000 ft., cleaning out at 940 ft.
Massey Oil & Gas 1 Government SE SW SE 11-2s-31e
Drilling 1,760 ft.

Blaine County

Cherry Ridge Synd. 1 Harbolt . NW NW SW 1-35n-20e
Drilling 1,140 ft., water and show of oil at 667 ft., cased off.

Carbon County

Continental 1 Prigge ..... SE SE SE 33-9s-25e
T.D. 3,562 ft., swabbed 83 bbl. in 24 hours, will acidize again, top Embar 3,490 ft., top Tensleep 3,523 ft.

Fallon County

Montana-Dakota Utilities 141 Government, SE NW NE 24-8n-59e, Cedar Creek gas field, was completed at 1,028 ft. in Judith River formation for 106,000 cu. ft. of gas a day.

Montana-Dakota Utilities 144 ..... SW NE NW 25-8n-59e
Drilling 1,438 ft. First report.
Montana-Dakota 140 ..... SE NW NE 24-9n-58e
Drilling below 650 ft.

Garfield County

H. H. Schwartz, Jr., 1 Charles..... SE NW 21-15n-30e
Cemented 10¾-in. through third Cat Creek sand at 1,200 ft.

Glacier County

Cut Bank had one completion and one new operation.

Santa Rita Oil & Gas 4 Government, CSL NE SE 4-32n-5w, swabbed 60 bbl. at 3,052 ft., total depth, from the lower Cut Bank sand at 3,040-48 ft. Upper Cut Bank at 3,030-40 ft. and Sunburst at 2,995-3,015 ft. were dry.

Texas 3 Unit 11, CWL SW NW 11-35n-6w, a completion last week, but sand record not reported, swabbed 242 bbl. The Moulton sand at 2,850-68 ft. was dry. Sunburst at 2,895-2,903 and 2,935-55 ft. also was dry. There was a small show of oil in the upper Cut Bank at 2,955-3,006 ft. and the main pay was at 3,009-11 ft.

Texas 5 Tweedy ..... C SW NW 21-35n-6w
Location. First report.
Glacier 2 Abraham ..... SW SW SE 19-34n-5w
Drilling 675 ft., top Colorado 420 ft., cemented 10¾-in. at 436 ft.
Texas 4 Schlag ..... NE SW SE 26-35n-6w
Cemented 10¾-in. at 445 ft., top Colorado 419 ft.
Par Oil 3 Tribal-170 ..... NE NW SW 7-32n-5w
Spudding 70 ft.
R. C. Jeffries 2 Clarke ..... NW SW 34-35n-6w
Spudding 20 ft.
A. B. Cobb 7 Walburger ..... NW SW SW 35-35n-6w
Drilling 2,250 ft.
M. R. Wagner 1 Tribal-184 ..... NE NE NE 13-32n-6w
Drilling 1,900 ft.
Texas 10 Tribal-122 ..... CEL NW SE 6-32n-5w
Cemented 10¾-in. at 560 ft., top Colorado 530 ft.
A. R. Pardue 1 Tribal ..... SW SE NE 19-32n-5w
Drilling 850 ft., top Colorado 390 ft.
Montana-Dakota 1 Tribal-112 .... SW NW NE 16-35n-6w
Drilling 2,615 ft., small water at 2,460-65 ft.
Montana Headlight 7 Britton ... NW NW SE 11-34n-6w
Cemented 10¾-in. at 523 ft., top Colorado 523 ft.
A. B. Cobb 1 Teterud ..... NE NE NE 24-37n-5w
S.D. 2,704 ft.
Glacier Prod. 3 Hall ..... NW SE 35-36n-6w
Cemented 7-in. at 2,985 ft.
R. C. Tarrant 3 Wold-fee ..... C NE NE 13-34n-6w
Cemented 8⅝-in. at 414 ft., top Colorado at 390 ft.
Hannah-Porter 5 Allott-130 .... CWL NW SE 6-32n-5w
Cemented 7-in. on bottom at 2,902 ft., top Cut Bank 2,902 ft.

Liberty County

W. E. Drought 1 Thieltgus ..... SE SE SW 21-31n-5e
Drilling 505 ft. First report. Chester district.

Phillips County

Montana-Dakota Utilities Co. had two completions and nine new operations in the Bowdoin gas field. New wells are spudded to around 100 ft. with light machine, where surface casing is set and rig moved off for heavier equipment which drills them down to the gas sand. Its 606 Government, SW SW 22-33n-32e, was completed at 1,066 ft. for 250,000 cu. ft., and 603 Norman, NE NW 32-33n-33e, was completed at 1,126 ft. for 537,000 cu. ft.

Montana-Dakota 607 ..... SW SW 21-33n-32e
Cemented surface pipe and S.D. at 108 ft. First report.
Montana-Dakota 608 ..... NW NW 32-33n-32e
Spudded to 105 ft. and S.D. First report.
Montana-Dakota 609 ..... SW SW 35-33n-32e
Drilling 1,050 ft. First report.
Montana-Dakota 610 ..... Lot 4, 6-32n-33e
Spudded to 100 ft. and S.D. First report.
Montana-Dakota 611 ..... Lot 7, 6-32n-33e
Spudded to 100 ft. and S.D. First report.
Montana-Dakota 612 ..... WL NE NE 7-32n-33e
Spudded to 100 ft. and S.D. First report.
Montana-Dakota 615 ..... SE SW 5-32n-33e
Spudded to 104 ft. and S.D. First report.
Montana-Dakota 616 ..... SE NW 5-32n-33e
Spudded to 110 ft. and S.D. First report.
Montana-Dakota 617 ..... SW SW 4-32n-33e
Spudding at 50 ft. First report.
Montana-Dakota 605 Martin ..... SE SE 22-33n-32e
Cemented 8⅝-in. at 103 ft. and S.D.
Montana-Dakota 604 Smith ..... SE SE 23-33n-32e
S.D. 130 ft.

Pondera County

R. C. Tarrant 1 Lang ..... SE SE NW 14-31n-5w
Cleaning out at 2,755 ft., 5½-in. run to 2,750 ft., 1,000 ft. of water from Sunburst at 2,685-2,705 ft.

Stillwater County

Texas 1 Unit ..... SE NW 10-4s-19e
Drilling 4,788 ft.

Toole County

In the Devon district, Montana-Dakota Utilities 1 Lake City Bank & Trust, NE SE 17-33n-2e, was dry in the base of the Colorado shale at 815 ft.

Kevin-Sunburst had four completions. Pacific National Oils 1 Davidson, SW NE NE 28-35n-3w, pumped and flowed 127 bbl. first 26 hours at 1,738 ft. This company is a newcomer in the field and is controlled by the California interests which are building the Production Refining Corp. 1,000-bbl. refinery at Shelby.

Pacific National Oils 9 Government, NE SE SE 8-35n-2w, pumped 75 bbl. a day in the contact at 1,630 ft., which also is the total depth. It was acidized.

McKnight & Stock 3 State, NE NW NW 16-35n-2w,

OIL WELL OPENS NEW BRANCH STORE AND SALES OFFICE IN TULSA

Oil Well Supply Co. recently completed arrangements for improved service to customers in the Tulsa area by establishing a large suite of uptown offices in the Kennedy Building and at the same time moving its branch store into new quarters across the street from its former location. These changes followed the sale of "Oilwell's" former properties to the Taylor Paper Co. and the Unit Rig & Equipment Co. The new "Oilwell" store at 406 West First Street is modern in every respect, including furniture and fixtures.

Oil Well Supply Co.'s new city offices are ideally arranged for efficiently serving oil operators, especially in furnishing technical information promptly to engineers and purchasing departments. "Oilwell's" Tulsa sales organization, headed by E. E. (Ned) Robbins, includes a capable technical staff that is well equipped for the speedy and accurate handling of inquiries, orders and shipments.

pumped 60 bbl. at 1,602 ft., total depth, after acidizing. Contact was at 1,596 ft.

Big West Oil 18 Dahlquist, CWL NW NE 28-35n-3w, was abandoned at 1,763 ft. It was shot with 40 quarts and then acidized, but the acid was not recovered.

Prevol & Shay 1 Government.....SW NW 15-35n-3w
Drilling 1,020 ft.
Frank P. Walsh 1 Mowat..... SW NW SE 7-33n-2e
Drilling 1,118 ft.
Crumley & Son 20 Fryberger .... SW SW NE 24-35n-3w
Drilling 1,605 ft., contact at 1,585 ft., dry.

NORTHWEST NEW MEXICO

Bernalillo County

Norins Realty 2 Pajarito.....22-9n-1e
Cleaning out to resume at 2,000 ft., contract depth 3,500 ft.

McKinley County

Petroleum Products 11 Hospah..SE NW SW 1-17n-9w
Drilling below 1,500 ft.
Teague, Greer 1 Santa Fe.....33-18n-10w
Drilling below 1,400 ft.
Petroleum Producers 9 Hospah NW NW SE 1-17n-9w
T.D. 1,570 ft., testing, may abandon.

San Juan County

Interests which a few months ago purchased a Navajo Indian lease southeast of the Rattlesnake field at auction have organized the Red Cactus Oil Co. to drill a test and have begun spudding.

Red Cactus 1 Tribal..... SE SE SE 35-29n-18w
Spudding with cable tools. First report.
Art Green 1 Stark..... NE NE NE 28-29n-12w
S.D. 484 ft. First report. Aztec district.
Pete Siemens 1 Medina..... NE NE NE 33-29n-12w
Drilling 500 ft. First report.
Southern Union 1 Government..NW SW SE 13-29n-12w
Drilling below 1,000 ft. First report.
Claude Carroll 1 Cornell..... SW NE 11-29n-12w
Drilling 1,895 ft. in sand. Est. 1,000,000 cu. ft. of gas at 1,885 ft.
Kutz 1 Government.....NW NW 28-28n-10w
Drilling 1,650 ft.

San Miguel County

Southwest Drilling 1 Conchas.....NW NE 34-17n-21e
Drilling 2,630 ft. in hard gray lime.

UTAH

Daggett County

Mountain Fuel Supply 5 Murphy SW NE SW 15-3n-24e
Coring 5,948 ft., top Frontier 5,581 ft.

Summit County

Longwell Petroleum 1.....SE SW SE 35-3n-5e
T.D. 3,365 ft., sidetracking lug.

Southwest Texas Fields

(Continued from Page 220)

Live Oak County

Adams & Lyles 1 Alamo Lumber Co., NE of Fant City, T.D. 1,573 ft., dry.
Hundred and One Oil Co. 1 Benham, L. M. Hitchcock Sur., coring 1,643 ft.

Medina County

J. A. Tarver 1 Lindeburg, J. Christilles Sur. 389, drilling shale 780 ft.

San Patricio County

Norsworthy Production Co. 1 McDaniel, NW of Gregory, T.D. 6,250 ft., S.D.

Willacy County

Pan American 1 Garcia, 14 mi. E of Lyford, drilling shale 7,250 ft.

K.M.A. Activity Declining

The K.M.A. field in Wichita County, North Texas, for the past 3 years has been the most active field in the district. During the past few months development has dropped off until at present there are only 14 wells actually drilling in the field. Figures show that 37 tests are drilling and 15 locations are staked; however, the majority of them are inactive.

The slack in activity is partly due to the constantly changing proration system in Texas and partly due to the fact that the field already has a total of 1,442 producing wells. With the exception of a few thin-pay-section areas throughout the center and on the east side of the field, the proven area has been about drilled up.

About 3 months ago a deep producing level from the Ellenburger lime of Ordovician age was opened in the south central part of the field; however, to date there have been only two wells completed in this level. The Ordovician producing horizon is very thin and is immediately topped by a thick water-bearing lime which renders impossible the completion of water-free wells from this deep level.

The greatest amount of activity in the field at present is on large leases not yet drilled to density and on outlying leases where the field limits are being pushed one location at a time.

Glen Field Revives Interest In Old Mirando District

After 4 months of development, the Glen field, Webb County, looms as one of the most important strikes that has been opened in the Laredo district in several years. Opened in May of this year, production has been extended about 1 mile north and south and approximately ½ mile east and west, with the limits of the field still undefined in several directions.

The discovery well, Interstate Minerals, Inc., 46 Bruni, located in the J. J. T. Wright Survey 309, was completed in the Mirando sand at 2,173-85 ft., the total depth for an initial production of 40 bbl. per hour flowing through a ¼-in. choke. With the expansion of the producing area, several independents within the past few weeks have entered the field, and at the prsent time five rigs are running, and there is a possibility that this number will be increased in the near future.

The field is a typical Mirando type field, being an anticlinal structure located on strike with the Mirando City field, about 2 miles to the northeast. The structure was found by subsurface geology and trend wildcatting.

The producing horizon ranges from 2,165-95 ft., with the sand thickness depending on structural position between 3 and 15 ft. The west side of the field is fairly well defined by four dry holes which were drilled by O. W. Killam on the A. M. Bruni lease in Sections 52, 68 and 69.

At a recent date there were 20 producing wells in the field, 6 of which were completed as flowing wells, 1 gas well and 13 pumpers. Drilling is done with light rotaries, and the usual completion time is from 7 to 14 days. Seven and five-inch casing is used as the production string, which is usually cemented on top of the sand section.

Principal operators in the field other than Interstate Minerals, Inc., include Transwestern Oil Co., Pitkin & Goidston, O. W. Killam, House & Campbell, and Holland & Simmons.

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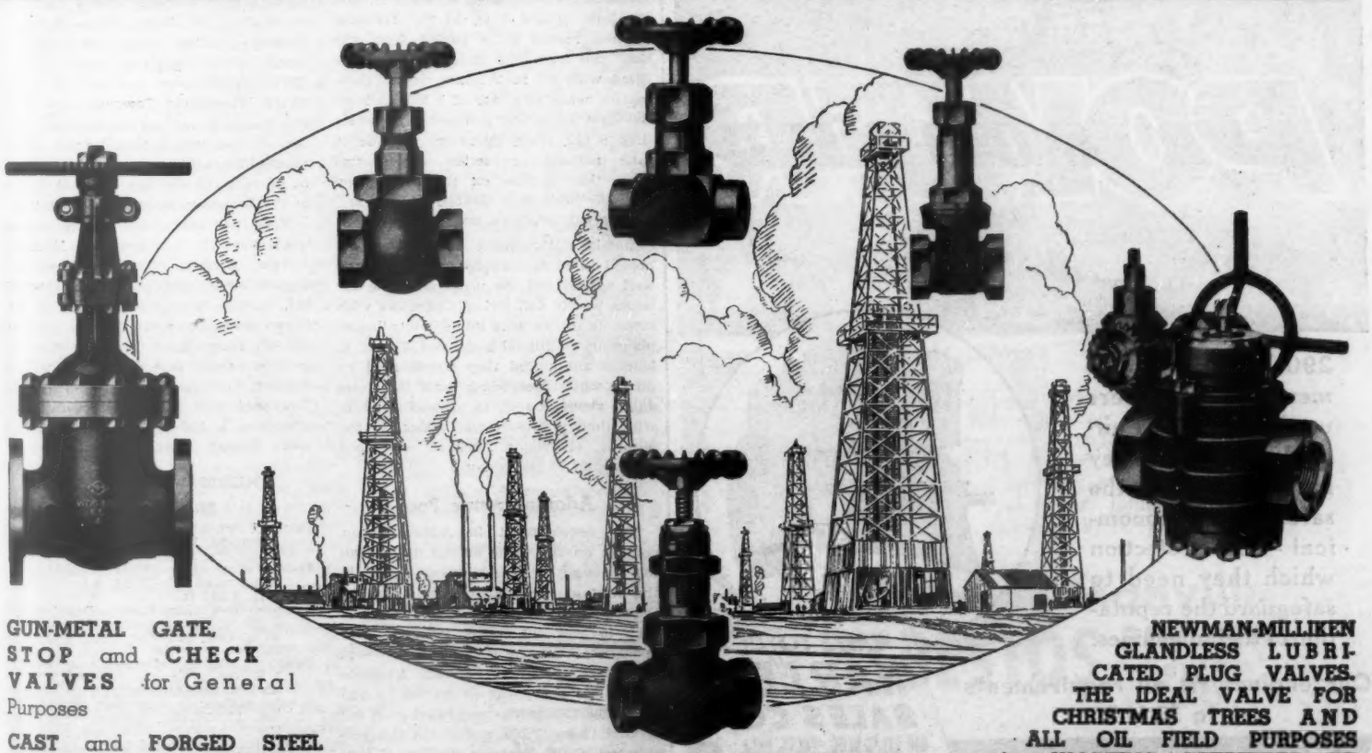

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MICHIGAN OPERATIONS

First Field Discovered in Michigan's Thumb

By OTTO C. PRESSPRICH

SAGINAW, Mich., Sept. 16. — Huron County jumped back into the limelight last week, luring scores of oil men into the Thumb of Michigan on the heels of an oil strike from a well that was producing better than 200 bbl. a day, naturally.

Almost simultaneously, interest soared anew in the new Adams pool of Arenac County, where the second offset to the Rayburn-Major 1 Yenior discovery well flowed at a rate of nearly 100 bbl. an hour for 1½ days before being pinched in due to a lack of facilities for handling the production.

The Huron County well, first commercial producer in the Thumb area, which experienced a premature flurry last June, is Fortney 1 Elmer McDonald, SW NE NE 20-17n-4e, Bloomfield Township, 1¼ miles south and slightly east of Teater & Markle 1 Johnston, in Section 8, which got a good showing of oil in early June, met acidizing difficulties and is to be deepened in search of a lower pay in the Sylvania.

The Fortney well, drilled in cooperation with Cryden Petroleum Co., is in a block of several thousand acres leased originally by Charles W. Teater of Saginaw and Wallace Markle of Bad Axe, Huron county seat. Unlike the Teater & Markle test, which got its oil show in the Dundee, 1 McDonald is producing from near the top of the Traverse. The formation was reached at 1,425 ft. and the hole drilled 2 ft. in the Traverse after a record 9-day period from the time the well was spudded. The hole filled with oil in 2 hours, began flowing by heads at a rate of 5 bbl. an hour the first 24 hours, increasing to better than 8 bbl. later. Operators planned to take natural production for several days, then acidize on the assumption that the well may do 500 bbl. a day. Strong gas pressure was noted.

Hotels and rooming houses were reported filled to capacity as news of the well spread and the usual scramble for leases was in full swing. Operators with interests in the area immediately began planning additional tests and Teater & Markle announced they would drill an offset while proceeding with the deepening about 300 ft. to around 3,200 ft. with their Johnston test which, in the Monroe, at around 2,650 ft., was good for around 15 bbl. a day.

Adams-Arenac Pool

The development in Adams-Arenac, coming on the heels of the disappointing showing of the previous week in the first of the confirmatory tests for the Yenior discovery, tended, operators said, to bear out earlier predictions of geologists that the Adams field would be spotty. Smith Petroleum 1 Stone missed the heavy pay in Section 14 and in a lower formation was rated good for around 15 to 20 bbl. a day, but this second test, C. W. Teater 1 William Rockafellow, NW SE NE 22-19n-3e, direct offset to the Yenior, topping the Dundee dolomite at 2,870 ft., hit a productive pocket. Mr. Teater said the hole was drilled 4 ft. into the formation, after which the heavy flow began, producing about 3,300 bbl. over a 36-hour period. No immediate acidizing is contemplated.

This Teater well is considerably better than the discovery well, which was rated at 1,900 bbl. a day, after acid treatment, and which produced at that rate for a month, although production now is said to be declining, along with water encroachment.

Several other tests are active in the area, nearest to completion being Teater 2 Rockafellow, NE SE NE Section 22, which was expected to be drilled in over the week end. Mr. Teater was not optimistic, however, as Pure 1-A State-Arenac, SE SE SW Section 15, east of 1 Rockafellow, appeared a probable dry hole perhaps marking an eastern boundary.

For Michigan as a whole last week there were 24 recorded oil and gas-well completions, of which 12 were unsuccessful oil tests, many of a wildcat nature, 1 a gas-test failure. However, Taggart Brothers completed their third big gas well in the newly opened field in Missaukee County's Riverside Township. The well, 38 Shurman et al, had open-flow potential of 11,440,000 cu. ft.

Hamilton Pool Activity

In Sun Oil Co.'s new field in Clare's Hamilton Township five projects were making good headway, Sun 1 McGregor, in Section 15, being below 3,700 ft., dolomite testing being expected in a week. While Taggarts completed their 39 Wyman-Theares gas well in Section 29 of Winterfield Township for 7,830,000 cu. ft. a day, an unsuccessful wildcat oil test was reported from Clare's Surrey Township where Gulf 1 Streib, in Section 11, was dry at 4,030 ft. Top of the Dundee was logged at 3,934 ft.

More than half of the completions last week were in southwestern Michigan, Allegan County recording three producers with potential aggregating 250 bbl. a day, and three dry holes; Van Buren three dry holes and one good for 200 bbl. a day; Kent three dry holes and a million-cubic foot Berea gas well in Walker Township. Ottawa's Tallmadge Township had a 126-bbl. well. There also was a 150-bbl. producer in Tuscola's Wisner Township.

MICHIGAN COMPLETIONS

Allegan County

Dorr Township: Smith Petroleum 1 Winifred Stone, NE NE SW 3-4n-12w, dry, T.D. 1,793 ft.
Heath Township: Miller Brothers 1 Schutmaat SE SE SE 9-3n-14w, dry, T.D. 1,614 ft.
Overisel Township: Crown Development 1 M. J. Klinginberg, NW NE NW 21-4n-14w, 100 bbl., acid, T.D. 1,594 ft.
Salem Township: Homerick & Kendall 1 Miller & Brooks, NW NE NW 12-4n-13w, 100 bbl., acid, T.D. 1,601 ft.
John McLean 1 John Post, SE SW NE Sec. 15, 50 bbl., natural, T.D. 1,608 ft.
Wic R. Wilson et al 1 T. L. Lagodny, NE NW SW Sec. 35, dry, T.D. 1,716 ft.

Cass County

Silver Creek Township: Silver Creek 1 Bakeman, NE SW SE 15-5s-16w, dry, T.D. 872 ft.

(Continued on Page 239)

Wildcat Failures Continue As Prospecting Spreads

By GEORGE WEBER

JACKSON, Miss., Sept. 16.—Abandonment of more deep tests brought disappointment to several Mississippi operators during the past week, but new locations for tests in several counties served to keep the state's activity at about the same level. Alabama is entering the wildcatting picture more each week, with nine active operations this week and more scheduled.

Geophysical activity is tapering off in Mississippi, where it is now centered in the southern section. A total of about 45 crews are shooting in that state, and Alabama is showing an increase in geophysical activity, with 11 crews active.

Tinsley drilling continues normal, with interest increasing on the south end. The north end of the pool, where Tuscaloosa production was recently discovered, is the main center of attention, however, and recent extensions to the north, northwest and northeast presage continued drilling in edge locations there.

The field's production declined for the first time since early July, averaging 24,635 bbl. during the past week. Production for the past several weeks has exceeded actual demand, with operators running large quantities to storage.

Wildcatting

Several new wildcat operations of interest were announced during the past week. In Newton County, East Central Mississippi, the Kingwood Oil Co. has staked 1 State land, a 4,500-ft. test in which other operators are interested. Magnolia Petroleum Co. and Exchange Oil Co. will drill a deep test, reported to go 9,000 ft in Warren County, on a block of 13,700 acres about equally held by the two companies. The test, 1 Paxton-Brown, is located south of the Glass dome, which was drilled several months ago, on a structure outlined by seismograph and believed to be a deep-seated dome.

Attala County gained another test, with the staking of F. R. Jackson and Paul Spearman 1 Crosby in 3-14n-7e, reported to be contracted to 5,200 ft. Authentic reports schedule another test in Tallahatchie County in the near future, to go 4,000 ft. in the Charleston area.

Alabama drilling is strong, with operations in eight counties. An 8,500-ft. test in Bon Sesecours Bay, Baldwin County, is planned by Westbrook, Thompson and Stewart, who hold about 600,000 acres in the area. The block has been surveyed by seismograph, magnetometer and soil analysis and a test is due to begin by November 1.

Several wildcats were abandoned during the past week, some of which, however, had been inactive for several months. In Montgomery County, Gulf Refining Co. 1 Parker was abandoned, after operators failed to sidetrack successfully around a fish at total depth of 5,303 ft. To the northwest in Tallahatchie County, Lewis & Lerew abandoned No. 1 Westbrook after encountering igneous material at 4,309 ft. Pickens was definitely defined on the southeast by failure of the Exchange Oil Co. et al 6 Wilburn, dry at 4,865 ft.

In the southern section of the state, Jefferson Davis County, Exchange Oil Co. abandoned 1 J. J. Newman Lumber Co. at 5,025 ft. after topping the Wilcox at 3,442 ft. Another Yazoo County failure was marked by the abandonment of Petroleum Exploration Co. 1 L. E. Vandevere, a highly regarded test.

Tinsley gained one of the best wells in the field as Union Producing completed 1 Robinette on the southeast edge of the field for an initial production of 618 bbl. The test has 94 ft. of Woodruff sand from 4,770-4,864 ft. and was completed through perforations at 4,830-55 ft. near the base of the sand. This extension will increase interest in the southeast section of Tinsley.

MISSISSIPPI COMPLETIONS

Wildcat—Copiah County

G. C. Koch 1 W. W. Broome, SW SW SE 1-9n-8e, dry, T.D. 3,542 ft.

Wildcat—Jefferson Davis County

Exchange 1 J. J. Newman Lumber Co., SE SE NE 36-7n-19w, dry, T.D. 5,025 ft., top Wilcox 3,442 ft.

Wildcat—Lamar County

Miss. La. Oil Synd. 1 Simmons, NE SE NE 32-3n-14w, dry, T.D. 2,000 ft.

Wildcat—Montgomery County

Gulf 1 Fred Parker, SE SW 22-19n-7e, dry, T.D. 5,303 ft., failed to sidetrack around fish.

Wildcat—Tallahatchie County

Lewis & Lerew 1 Westbrook, SE SE 18-23n-2w, dry, T.D. 4,309 ft.

Wildcat—Washington County

Charles Perkins 1 General American Farms, NE NE SE 9-14n-8w, dry, T.D. 500 ft.

Wildcat—Wayne County

Tri-County 1 Jones, SW SE 33-8n-7w, dry, T.D. 20 ft.

Pickens—Yazoo County

Exchange & Kingwood 5 Wilburn, NW NW NW 31-12n-3e, dry, T.D. 6,043 ft., top Selma 3,877 ft., top Eutaw 3,812 ft., top Tuscaloosa 4,865 ft.

Tinsley—Yazoo County

Union 1 E. Robinette, NE NE NW 19-10-2, 618 bbl., ¾-in. chokes, T.P. 175 lb., Woodruff sand 4,770-4,864 ft., set 7-in. casing 4,900 ft., perf. 4,830-55 ft.

Wildcat—Yazoo County

Petroleum Exploration Co. 1 L. E. Vandevere, SW SW SE 25-13n-1w, dry, T.D. 6,345 ft., top Midway 3,835 ft., top Selma 4,645 ft., top Eutaw 5,430 ft., top Tuscaloosa 6,110 ft.

MISSISSIPPI FIRST REPORTS

Wildcat—Attala County

F. R. Jackson and Paul Spearman 1 W. H. Crosby, NW NE 3-14n-7e, spudding.

Wildcat—Grenada County

L. L. Peeples 1 J. A. Thomas, NE NW NW 17-21-16.

Wildcat—Newton County

Kingwood Oil Co. 1 State Land, NE NE SE 27-8n-10e, spudding.

Wildcat—Warren County

Magnolia et al 1 Paxton-Brown, NW NW 13-14-4e.

Wildcat—Wayne County

Kingwood Oil Co. 1 M. & O. Railroad, NE SE 7-8n-8w.

Tinsley—Yazoo County

Slick-Urschel 11 Slick est., NW NE NW 2-10-3, rigging up.
Union Producing 1 Perry-Woodruff unit, SW SE 13-10-3.
Union 2 Robinette, SE NW NE 19-10-2.
Union 17 Stevens, NW SE 12-10-3.

MISSISSIPPI DRILLING REPORT

Attala County

Jones & Crosby 1 J. F. Allen SW SW 33-13n-5e, set 10¾-in. casing 432 ft., waiting on cement.
Hawkins, Howell & Mathews 1 Weeks, NW NW SW 29-15-6e, drilling 5,013 ft.

Grenada County

Womble & Williams 1 Connecticut Gen-

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LEGAL

Department of the Interior, United States Land Office, Cheyenne, Wyoming. Notice is hereby given that a lease of the oil and gas deposits in lot 3 Sec. 25, T. 56 N., R. 97 W., 6th P.M., 51.46 acres, in the Byron oil and gas field, Wyoming, is offered to the responsible qualified bidder of the highest bonus per acre, pursuant to the provisions of section 17 of the act of February 25, 1920 (41 Stat. 437), as amended, at the royalty rate scale in the lease form shown in Circular 1386, at the sale to be held in the office of the Register of the district land office at Cheyenne, Wyoming, at 10.00 o'clock A.M., on September 25, 1940. The successful bidder will be required to deposit on the day of the sale a certified check on a solvent bank, or cash, for one-fifth of the bid, and file a showing of qualifications to receive the lease, required by section 7 of General Land Office Circular 1386. The remaining four-fifths of the amount bid, together with the annual rental in advance, at the rate of $1.00 per acre, must be paid and a $5000 corporate surety bond must be furnished prior to the issuance of the lease. The bidders are warned against violation of the provisions of section 59 of the United States Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids at the discretion of the Secretary of the Interior. Register.

LEGAL

Department of the Interior, United States Land Office, Las Cruces, New Mexico. Notice is hereby given that a lease of the oil and gas deposits in the following described lands is offered to the responsible qualified bidder of the highest bonus per acre, pursuant to the provisions of section 17 of the act of February 25, 1920 (41 Stat. 437), as amended at the royalty rate scale in the lease form shown in General Land Office Circular 1386, at a sale to be held in the office of the Register of the District Land Office at Las Cruces, New Mexico, at 10 a.m. on October 14, 1940: E½ SE¼ Sec. 15, T. 17 S., R. 32 E., N.M P.M., New Mexico, containing 80 acres. in the Baish oil and gas field. The successful bidder must deposit on the date of the sale a certified check on a solvent bank, or cash, for one-fifth of the amount of each bid, and file a showing of qualifications to receive the lease, required by section 7 of Circular 1386 The remaining four-fifths, together with the annual rental in advance at the rate of $1 per acre, must be paid and a $5,000 corporate surety bond must be furnished prior to the issuance of the lease. The bidders are warned against violation of the provisions of section 59 of the United States Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids at the discretion of the Secretary of the Interior. Register.

eral Life Ins. Co. NW SE 28-23n-5e, S.D. 450 ft. (cor.).

Jones County

T. N. Smith 1 Hollifield, NW SW NW 20-8n-12w, drilling 5,023 ft.

R. W. Williams et al 1 Eastman-Gardner, NE SW 7-8n-12w, fishing drill stem stuck at 4,800 ft., T.D. 7,004 ft.

Marshall County

C. B. Blosser 1 Charlotte Stansback, SE SE 19-3s-4w, rigging up.

Montgomery County

E. R. Henderson 1 Columbia Mutual Life Ins. Co., 30-21n-5e, drilling 3,513 ft.

Simpson County

Goodwill Oil & Gas Co. 1 Berry, 33-2n-4e, old T.D. 2,810 ft., drilling deeper, 2,816 ft.

Yazoo County

Joe Dawson 1 McGraw Curran Lumber Co., NW NW 19-11n-3w, drilling 5,327 ft.

Edward DeLoach 1 Wilburn, 6-12n-3w, drilling 807 ft.

Exchange Oil Co. 1 A. E. Edgar, SW NE NE, drilling 3,783 ft.

ALABAMA COMPLETIONS

Wildcat—Madison County

W. W. Newman et al 1 Dunk Hill, 35-5s-2e, dry, T.D. 295 ft.

Wildcat—Morgan County

F. W. Rohwer 1-A Karl Hough, SW NE NE 2-6s-1w, dry, T.D. 60 ft.

ALABAMA FIRST REPORTS

Wildcat—Morgan County

F. W. Rohwer 1-B Karl Hough, 2-6s-1w, drilling 135 ft.

ALABAMA DRILLING REPORT

Colbert County

Mellen & Gear 1 Alsobrook, SW NW 10-4s-15w. S.D. 1,048 ft.

Fayette County

B. L. Fillingame 1 Ala. Educational Ass'n., NW SW 3-16s-12w, drilling 974 ft.

Franklin County

E. O. Heath, Jr. 1 W. O. Hester, SW SW 4-6s-12w, drilling lime 147 ft.

Lawrence County

D. V. Mann et al 1 W. R. Jackson, NE NE NE 30-7-6, last report 1,660 ft., no report.

Madison County

J. L. Caldwell et al 1 J. McCord, NW SE SE 30-1s-2e, drilling 98 ft.

Marion County

Seaboard 1 Clarke et al, SE SW 28-11s-14w, drilling 2,579 ft.

Mobile County

George E. Lilly and A. R. Temple 1 Lockart, SE NW SW 24-7s-3w, S.D. 6,707 ft.

Walker County

Champlin 1 Galloway Coal Co., 12-13s-10w, drilling 2,253 ft.

CANADIAN FIELDS

Seek New Fields in Foothills Belt as Demand Rises

By VICTOR LAURISTON

CHATHAM, Ont., Sept. 14.—In West Central Turner Valley, Southwest Petroleum 4, LSD 4, 8-19-2w5, finished at 7,225 ft., 438 ft. in the limestone, flowed 940 bbl. flush production after acidizing both upper and lower zones. Temporary allowable has been set at 350 bbl. A new order of the Alberta Conservation Board has been issued setting the aggregate Turner Valley crude allowable at 26,837 bbl., retroactive to September 1. This includes the new producer but the gain is practically offset by reduction in other wells, leaving a net increase of only 9 bbl. Changes in allowables include Arrow Royalties 1, reduced from 800 to 750 bbl.; Commoil 3 from 500 to 400 bbl.; Extension Royalties from 400 to 350 bbl., and Royal Canadian from 261 to 161 bbl. Increases include Home Oil 2 from 1,025 to 1,225 bbl., Home 3 from 975 to 1,050 bbl., and Home 4 from 475 to 500 bbl.

Pacific Petroleum 5, LSD 6, 7-19-2w5, finished at 8,094 ft., 456 ft. in the Madison, blew into production under its own pressure after being swabbed twice. The well started at 50 bbl. an hour and delivered 1,196 bbl. in the first 22 hours without acidization. It was then choked down to 20 bbl. an hour for lack of storage. Initial gas-oil ratio was 1,100 cu. ft. and tubing pressure rose from 300 to 350 lb. during the 22-hour test. While drilling a complete core of the lime was taken showing several porous zones. It was intended to vary acid treatment according to porosity at the different horizons; but owing to the big production this plan may not be carried out, and treatment may be limited to the usual acid wash. At one time the well was tentatively abandoned owing to the small production secured at Anglo-Canadian 8, in the same section; but was resumed after securing geological advice.

A substantial number of new tests will be started in Turner Valley within the next few weeks. In the southwest area Northwest-Hudson's Bay 5 has been spotted in LSD 10, 8-18-2w5, trying out the proven area a little farther to the south and west.

Tests in the Foothills

On the Pouce Coupe structure in the northern foothills, Guardian Oil 1, 7-80-12w6, is below 6,700 ft. with a further show of crude.

On the Brazeau structure west of Edmonton, Home Oil 1, LSD 16, 7-43-17w5, has completed further production tests of horizons between 8,160 and 8,550 ft., and is arranging plans for further development.

On the Ram River-Clearwater structure, Ram River Oils 2, 1-37-11w5, is deepening after cementing casing around 516 ft. Clear Oils 1, LSD 8, 2-35-10w5, is below 50 ft.

On the Grease Creek structure west of Olds, Grease Creek-Northwest 1, LSD 2, 13-29-7w5, is cleaning hole preparatory to deepening to the lime from 7,017 ft.

Black Diamond Test

On the Black Diamond structure, west of North Turner Valley, Harris Royalties has foundations in and is working on derrick. The well will test a 160-acre tract taken over from the Mayland interests. The area has been active at various times since the earliest Turner Valley drilling, but none of the tests were carried to conclusive depths. Location is about 5 miles south and a little east of Home Oil 2, in North Turner Valley and 2 miles south and a little east of Anglo-Phillips No. 1 producer. George Harris and associates are sponsoring the venture which is the first test of a four-well program for this structure.

Mill Creek Test

On the Mill Creek structure west of Pincher Creek, Alliance 1, LSD 14, 11-6-2w5, faulted back from the Fernie shales to the upper Benton between 6,500 and 6,722 ft., after reaching a point where the Madison lime was confidently expected. Drilling was discontinued at 6,722 ft. Preparations are being made for production tests of oil horizons in the Blairmore and Fernie formations as well as an upper horizon around 4,600 ft. from which a 23-ft. saturated core was taken. This is the latest of several deep tests in the Pincher Creek area where serious faulting has been encountered before the Madison lime could be reached.

Border Fields

In the Twin River area, southern Alberta, Buckley Oils 1, LSD 4, 23-1-20w4, is below 620 ft. after cementing casing at 550 ft.

In the Spring Coulee area, Lyons-McIntyre 1, LSD 14, 19-3-21w4, has pulled casing and abandoned hole around 4,000 ft.

In the Taber field Border Petroleums 1, LSD 5, 32-19-17w4, bottoming at 3,480 ft., is securing pumping equipment for a production test. It has considerable crude and some water.

To Drill Blood Reserve

Northwest Co., wholly-owned subsidiary of Imperial Oil, will undertake systematic development of the extensive holdings of West Petroleum on the Blood Indian Reserve in southern Alberta near Lethbridge. West Petroleum has rights on approximately 180,000 acres and has carried on an extensive seismic reflection survey by the Heiland Research Corp. of Denver. Two pronounced structures were defined, of which the northern structure is one of the largest yet found in the Alberta plains area, with a very pronounced closure. Following the survey, West Petroleum leased 29,100 acres covering the two defined structures; and later Northwest Co. obtained an option to drill both structures, which was closed after its own seismic party had made an additional survey. Additional acreage bringing the total to about 40,000 acres has been secured. Drilling will start shortly on the southerly structure, and heavy-duty equipment is now being moved in. An agreement has also been made between Northwest Co., Treaty Petroleum and West Petroleum for drilling of the northerly structure at a later date.

Steveville Field

In the Steveville field east of Calgary, Standard of British Columbia 1 Princess, LSD 13, 22-20-12w4. has repaired derrick and is rigging up preparatory to resuming testing operations. The derrick was wrecked by a gas blowout while testing. Standard 2 Tide Lake, LSD 9, 19-18-9w4, several miles south and east, is abandoning at around 4,200 ft. The outfit will be moved to a new location in the Princess area.

Vermilion Field

In the Vermilion field, eastern Alberta, Vermilalta-Frankview 2, LSD 4, 20-50-5w4, is being finished after coring 8 ft. into the oil zone at a depth of 1,830 ft. Casing has been cemented and cement is being drilled out for a production test, with early indications of a good producer. The well was drilled as an offset to Franco-Battleview 2, which is reported pumping around 200 bbl. daily of heavy crude. Portable rotary from Vermilion-Frankview 2 has been moved to Western-Battleview 1, LSD 1, 30-50-5w4.

Market Record of Active Oil Stocks

Compiled by Carl H. Pforzheimer & Co., 25 Broad Street, New York City. Member New York Stock Exchange and New York Curb Exchange

New York Stock Exchange

1940 High	1940 Low	Week ended Sept. 14 High	Week ended Sept. 14 Low	Week ended Sept. 14 Close	Stocks—	Total shares outstanding	Par value	Latest dividend	Payable or last paid	Dividends paid in 1939	Com. sh. earn. 1939	Com. sh. earn. 1938	1939 High	1939 Low	1938 High	1938 Low
58½	38½	48½	47½	47½	Amerada Corp.	788,675	N.P.	50cQ	7-31-40	$2.00	$1.56	$2.07	74½	50	78	55
27⅛	18¼	22¼	21¼	21⅝	Atlantic Refining	2,663,999	$25	25cQ	6-15-40	1.00	1.66	1.40	24¾	18½	27⅝	17⅝
16⅝	8½	11	10¼	10¼	Barber Asphalt Co.	390,223	$10	25c	5-21-40	.25	1.39	—.85	21	10¼	23⅝	12⅛
13⅜	7⅛	8½	7⅞	8⅛	Barnsdall Oil Co.	2,558,779	$5	15c	9-9-40	.90	.76	1.26	19½	11⅛	21⅜	10⅛
8⅛	5⅛	6½	6⅛	6¼	Consolidated Oil Corp.	13,751,726	N.P.	20cQ	8-15-40	.80	.55	.55	9⅞	6⅛	10⅜	7
25	16⅛	18⅜	18	18⅜	Continental Oil of Delaware	4,682,572	$5	25cQ	9-30-40	1.00	1.35	1.10	31½	19⅜	35⅝	21¼
6⅞	3⅜	3⅞	3½	3½	Houston Oil	1,098,618	$25	....	10-17-30	....	.43	.83	9⅜	4½	9⅜	5
14⅜	9	10⅜	10¼	10¼	Lion Oil Refining	435,815	N.P.	25cQ	10-10-40	1.00	1.50	2.09	18¼	10	25⅛	15⅝
17⅜	11½	13⅛	12½	12½	Mid-Continent Petroleum	1,857,912	$10	40c	6-1-40	.60	1.42	.56	18	11⅛	22⅝	12¼
11	7⅛	8¾	8⅝	8⅝	Mission Corporation	1,378,645	$10	40c	12-15-39	.65	.87	1.04	14⅞	8¾	17¾	10⅝
9¾	4⅝	6	5¾	5¾	National Supply	1,155,517	$10	....	12-22-37	....	—.87	—.79	15½	5⅝	23	12½
8¾	5⅜	6⅜	6⅛	6⅛	Ohio Oil Co.	6,563,377	N.P.	20c	6-15-40	....	—.10	.25	10½	6	14⅞	8⅜
8¼	5⅝	6	6	6	Pacific Western Oil	1,000,000	N.P.	40c	12-19-39	.40	.81	1.22	11⅞	7	15⅞	10¼
10⅛	6¾	8	8	8	Pan American Pet. Trans.	4,702,945	$5	....	12-31-37	....	1.10	.08	8¾	5	9¼	6¼
41¾	27⅛	36½	35	35¼	Phillips Petroleum	4,449,052	N.P.	50cQ	8-31-40	2.00	2.21	2.03	46½	31¼	44⅜	27¼
22¾	15	16⅝	16⅛	16⅛	Plymouth Oil Co.	1,038,633	$5	35cQ	9-30-40	$1.40	2.38	2.59	24	17⅛	25⅝	15
11⅛	7	7¾	7⅜	7⅜	Pure Oil Co.	3,982,031	N.P.	25c	12-20-39	.25	1.11	.38	11⅝	6⅜	13⅛	8¼
8⅜	5⅞	8	8	8	Richfield Oil Corp.	4,010,000	N.P.	50c	12-18-39	.50	.65	.51	10¼	6⅝	9⅞	5
20	11	13½	12¼	12¼	Seaboard Oil of Delaware	1,244,383	N.P.	25cQ	9-14-40	1.00	1.40	1.52	24⅜	15½	27½	15½
13⅛	7⅝	9	8¼	8¾	Shell Union Oil	13,070,625	N.P.	25c	7-16-40	.50	.77	.72	17¼	9⅞	18⅜	10
23¼	12¼	17⅛	16¾	17	Skelly Oil	995,349	$15	25c	8-28-40	.75	1.99	2.27	29½	15½	34⅞	18½
12½	7⅛	9⅛	8¾	8¾	Socony-Vacuum	31,206,071	$15	25cSA	9-16-40	.50	1.10	1.29	15⅛	10¼	16⅜	10⅜
26⅛	17⅜	18¾	18⅜	18⅜	Standard Oil of California	13,003,953	N.P.	25cQ	9-16-40	1.10	1.38	2.22	33⅝	24¼	34⅞	25⅛
29	20¾	25⅛	24	24½	Standard Oil (Indiana)	15,272,020	$25	50c†	9-16-40	1.25	2.23	1.82	30	22¾	35½	24¾
46½	29⅞	36	33¼	34½	Standard Oil of New Jersey	27,280,998	$25	1.00†	6-15-40	1.25	3.26	2.86	53½	38	58⅜	39⅝
65⅞	46¾	49½	48½	49	Sun Oil	2,434,863	N.P.	25c*	6-15-40	1.00	2.74	1.07	66	45¾	65⅛	45
2⅛	1¼	1⅜	1¼	1¼	Superior Oil Corp.	1,388,979	$1	10c	12-28-38	....	.04	.24	3⅝	1⅜	4¼	1⅜
47⅝	33	37	35¼	35½	Texas Corp.	10,876,139	$25	50cQ	7-1-40	2.00	3.02	2.13	50¾	32½	49⅝	32⅝
4¼	2½	3⅛	2⅞	2⅞	Texas Gulf Producing Co.	888,146	N.P.	10c	6-15-40	.20	.69	.86	5¾	3¼	5⅞	2⅝
8⅝	5½	6¼	6	6	Texas Pacific Coal & Oil	888,236	$10	10c	9-3-40	.40	1.00	1.16	11⅜	7	12½	7
12	8¾	9⅝	9¼	9⅜	Tide Water Associated	6,371,827	$10	15c	9-3-40	.80	1.05	1.28	14¼	9½	15⅜	10⅛
17½	12	13	12⅞	13	Union Oil Co. of California	4,666,270	$25	25c	8-10-40	1.05	1.25	1.47	19¾	15⅛	22½	17⅛
29⅞	22¾	27⅛	26½	27⅛	Union Tank Car Co.	1,177,381	N.P.	45c	9-3-40	1.30	2.07	1.16	24¼	20⅛	23½	20
3⅝	1⅞	2	2	2	Wilcox Oil & Gas	470,768	$5	10c	2-15-40	....	.77	.52	4¼	2⅜	3½	1⅝

*Also 5 per cent in stock. †Includes extras. ‡Also 2 per cent in stock. §Also 4 per cent in stock. ‖Also 2½ per cent in stock. ¶Also 1½ per cent in stock. —Deficit.

New York Curb Exchange

1940 High	1940 Low	Week ended Sept. 14 High	Week ended Sept. 14 Low	Week ended Sept. 14 Close	Stocks—	Total shares outstanding	Par value	Latest dividend	Payable or last paid	Dividends paid in 1939	Com. sh. earn. 1939	Com. sh. earn. 1938	1939 High	1939 Low	1938 High	1938 Low
10¾	4½	5½	5⅛	5½	American Republics Corp.	1,308,049	$10	10c	7-11-38	....	$0.14	—.22	11¾	5½	11¾	5
3¼	1⅜	1⅜	1⅝	1⅝	Bridgeport Machine Co.	263,700	N.P.	$1.25	12-30-37	....	—.95	—.14	7¼	2½	10¼	4⅞
43	28	36¼	36¼	36¼	Buckeye Pipe Line Co.	200,000	$50	$1	9-14-40	$2.50	3.13	2.36	34¾	26½	39	22½
117	95	100¼	100	100¼	Chesebrough Mfg. Co.	120,000	$25	$1.50Q†	9-23-40	6.00	7.87	5.32	130	108⅝	128	97
6¾	4	6⅛	6	6	Cities Service (new)	3,703,978	$10	....	6-1-32	....	.68	.23	9¼	4¼	11	5⅛
2⅛	1	1⅛	1	1	Cosden Petroleum	465,332	$1	....	.....	....	....	....	2¼	½	2⅜	⅞
24¼	11⅝	14	13⅝	13⅝	Creole Petroleum	6,974,356	$5	50cSA†	6-15-40	1.00	1.38	1.64	28	16¾	27½	17½
4⅜	2⅞	3½	3½	3½	Darby Petroleum	351,390	$5	25cSA	1-15-39	.25	.03	.69	7⅛	3⅝	10¼	5½
2	1¼	..	..	..	Derby Oil & Refining	263,162	N.P.	....	.....	....	—.37	—.91	2⅝	1½	3½	1½
31	23	..	..	..	Eureka Pipe Line	50,000	$50	50c	8-1-40	2.00	.63	—.37	23	15⅛	31	16
39⅞	25⅛	30	28½	28½	Gulf Oil Corp.	9,076,202	$25	25cQ	10-1-40	2.00	1.69	1.43	45⅛	29¼	46⅞	33
68	47⅛	54½	53	53	Humble Oil & Refining	8,987,840	N.P.	62½c	10-1-40	2.00	3.33	3.98	71	52½	72⅝	56
12⅜	5½	8½	7⅞	7⅞	Imperial Oil of Canada	26,965,078	N.P.	37½c†	6-1-40	1.00	.71	.96	17	11⅜	19½	14⅛
7¾	3	3	3	3	Indiana Pipe Line	300,000	$7.50	10c	5-15-40	.50	.33	.47	7¼	5½	9⅜	6
19¾	8¼	12¼	11⅝	11¾	International Petroleum	14,324,088	N.P.	75c	6-1-40	1.75	1.19	1.98	27½	17	31¼	21
2¾	1⅝	..	..	..	Kirby Petroleum Co.	500,000	$1	10c	4-15-38	....	.06	.14	3¾	2⅛	5	2⅛
10¾	7⅝	9	8⅞	8⅞	Lone Star Gas	5,518,347	N.P.	20c	7-22-40	.70	.98	.88	10½	7⅛	10⅜	6⅝
6¼	3¾	4½	4¼	4¼	Louisiana Land & Exp.	2,966,762	$1	10c	9-14-40	.35	.22	.45	7¾	4	9⅜	6½
17	10	..	..	..	Margay Oil Corp.	149,943	N.P.	25cQ	7-10-40	1.00	1.52	2.28	17	14½	24	16
8½	6½	7⅛	7	7⅛	Midwest Oil Co.	998,474	$10	45c	6-15-40	.90	.99	.93	8¾	6⅝	9¾	6⅝
6¼	4⅞	5⅛	5	5	Mountain Producers	1,593,584	$10	30cSA	6-15-40	.60	.70	.62	6	4⅞	5⅝	4½
13⅛	10	11	11	11	National Fuel Gas	3,810,183	N.P.	25cQ	7-15-40	1.00	.95	.84	14	11¼	14⅝	11½
12½	8⅜	9⅝	9⅛	9⅛	National Transit	509,000	$12.50	50c	6-15-40	.85	.91	.88	9½	7¼	9¼	6½
1¼	⅞	1⅛	1⅛	1⅛	New Mexico and Arizona	1,000,000	$1	1c	12-1-37	....	.02	.02	1⅜	1	2⅝	1½
7⅜	5¼	5¼	5¼	5¼	New York Transit	100,000	$5	25c	9-20-40	.40	.88	.16	6	4	4½	3½
9⅞	6	..	..	..	Northern Pipe Line	120,000	$10	40c	6-1-40	.30	.31	.24	7	4½	6	4
5½	2½	3¼	3	3⅛	Pantepec Oil	2,856,872	$1	....	.....	....	....	....	7⅝	4	7¾	3½
3¼	1¼	2⅛	1¾	1¾	Root Petroleum Co.	336,045	$1	25c	2-1-37	....	.70	.17	5	1¼	4½	1⅝
2½	1½	2¼	2¼	2¼	Ryan Consolidated	298,931	N.P.	....	.....	....	.16	.29	3	1⅞	4	2⅛
11¾	4⅞	..	..	..	Southern Pipe Line	100,000	$10	25c	9-3-40	.30	.25	—.27	4⅞	3½	5⅜	3¼
44	28	..	..	..	South Penn Oil	1,000,000	$25	37½c	9-27-40	3.00	2.84	1.44	40½	26¾	39	28⅜
35	21	..	..	..	Southwest Penna. Pipe Lines	35,000	$50	50c	9-16-40	2.00	2.06	—.41	23	18	22¼	16½
20⅞	16½	18⅝	18¼	18⅜	Standard Oil of Kentucky	2,604,790	$10	25c	9-14-40	1.30	1.53	1.45	20½	17¼	18⅜	15
41¾	26¼	31½	31	31	Standard Oil of Ohio	753,740	$25	25c	9-14-40	1.50	6.64	1.81	32¾	17	22¾	16¼
2	1⅜	1½	1⅜	1⅜	Sunray Oil	1,975,876	$1	5c	5-1-40	.10	.25	.23	2⅜	1⅜	3¼	2
3	2	2⅜	2⅝	2⅝	Texon Oil & Land	936,024	$2	10c	9-30-40	.10	.49	.56	4	2⅝	5¼	3½
3⅜	2	2¼	2⅛	2⅛	Transwestern Oil Co.	750,000	$10	....	.....	....	—1.42	.12	6	2½	5¼	2⅝
2⅛	1/16	1¼	1⅛	1⅛	United Gas Corp.	7,818,959	$1	....	.....	....	—.55	—.51	3⅜	1½	5¼	2⅝

†Includes extras. —Deficit.

Personal Paragraphs

FREDERIC R. SPEED, of Chesapeake City, Md., has been appointed automotive engineer of the Pennsylvania Grade Crude Oil Association, succeeding the late Harry M. Rugg, who was killed in an auto accident near Du Bois, Pa., early in the summer. Mr. Speed's experience covers several years with automobile manufacturers, Standard Oil Co. of New Jersey, Ethyl Gasoline Corp. and Bijur Lubricating Co. In 1930 he rejoined the Ethyl organization as contact engineer, handling technical and promotional activities for the corporation in its relations with automotive manufacturers and other engineering agencies.

DEWEY WAGGONER, drilling superintendent with Murray & Griffey, has resigned his position. ED MURRAY will be transferred from Abilene, Tex., to Jackson, Miss., to take his place.

OSCAR R. HOWARD, California independent operator, with producing wells in Santa Fe Springs and other districts, has returned to Los Angeles, Calif., following a vacation spent in Honolulu.

J. A. (JACK) HORNER, formerly in the legal department of Shell Oil Co., Inc., at Tulsa, has been transferred to Centralia, Ill., where he will be in charge of the miscellaneous division of the legal department at that office.

CLARENCE BERGEN, of General Petroleum Corp.'s Torrance, Calif., refinery, has a hobby that pays both ways. Bergen, who is a cousin of Edgar Bergen, Charlie McCarthy's "stooge," raises silver foxes and the experience gained during the past 8 years makes him an expert on fox farming.

THOMAS H. RISK, for the past 5 years with the Pure Oil Co., has joined Ethyl Gasoline Corp. in the refinery-technology division, it has has announced by WILLIAM H. HUBNER, in charge of that division. Prior to joining Pure Oil Co. as automotive engineer in 1935, Mr. Risk was with Socony-Vacuum Oil Co., Inc., in the Paulsboro laboratories.

ALVIN RICHARDS, general counsel of the southwestern producing district of Pure Oil Co., Tulsa, is the new chairman of the Mineral Section of the American Bar Association. He was elected at the convention of the association held in Philadelphia, Pa., last week.

A. SILVERBERG, formerly chief chemist and assistant superintendent of the Sinclair-Pierce Oil Co.'s refinery at Tampico, Mexico, is now situated at Jersey City, N. J., as manager of the refinery of the American Wax Refining Corp. This is a new plant which was only recently completed.

O. P. KEENEY, of the Wolverine Empire Refining Co., Oil City, Pa., has been elected chairman of the Venango County division of the Associated Petroleum Industries of Pennsylvania.

WALTER H. WOLF, of Omaha, Neb., is a new instructor in petroleum refining at the University of Tulsa, replacing DR. J. A. JOHNSTON, who has gone to a new teaching position at Yale University.

FRANK A. WATTS, purchasing agent for Humble Oil & Refining Co. and O. D. STORY, purchasing agent for Shell Oil Co., will serve as cochairmen of the big-gifts division of the coming Houston, Tex., Community Chest drive.

N. D. McLEAN, for the past 6 years on the staff of Lloydminster Gas Co., Lloydminster, Sask., Canada, with Mrs. McLean and children, is leaving for Trinidad, British West Indies, as assistant production engineer for a British oil company.

JOHN W. VAN TYNE, Bradford, Pa., who was awarded the title of Grand Old Man at Tulsa in 1938, has recovered from an illness lasting over a year and is again looking after the oil property which his family began operating 63 years ago. On September 30, Mr. and Mrs. Van Tyne will celebrate their sixty-first wedding anniversary.

Do You Remember?

From The Oil and Gas Journal Files

25 YEARS AGO

Oklahoma operators were agreeably surprised September 11, 1915, when the crude market advanced 5 cents, making the present quotation 80 cents. This is the sixth increase since August 1 and is an increase of 80 per cent in 40 days —a record for the advance of oil.

The Tampico, Mexico, field continues to lead the world with big gushers. Latest completion is a 90,000-bbl. daily producer drilled by George Harmon and associates on property on which White & Sinclair of Tulsa have an option.

20 YEARS AGO

W. W. Zingery, Turman Oil Co. official, finding the roads in the Okmulgee field rough and muddy, used an airplane to visit company properties, making a 40-mile trip in as many minutes. This company is finding the airplane to be a great convenience in long and difficult trips.

Mississippi is due for considerable field activity this fall and winter, as a result of the recent discovery of gas near Charleston. A new well has been started, several others are planned and lease activity is increasing.

Gladys Belle Oil Co. is getting in machinery for a compressing casinghead plant in the Okmulgee, Okla., field. There has been a lot of this product going to waste in that section.

10 YEARS AGO

Although the C. M. Joiner wildcat in Rusk County, East Texas, looks like a Woodbine sand discovery, only a few companies and individuals have been leasing in the area and trading isn't very brisk. Many operators are wary of making lease purchases because of title conditions.

John R. Suman, director of Humble Oil & Refining Co., has a strange hobby, to-wit: Trying to develop a generation of engineers who will be able to take hold of petroleum production in the coming years and direct it along genuinely scientific lines.

P. A. MEYERS, geologist for Pan American Production Co. at Corpus Christi, Tex., has been transferred to the company's offices at Houston, Tex.

ALTON B. COX, a member of Texas Co.'s staff at Shanghai, China, is spending an extended vacation in California and while here will transact some company business.

LeMAR RAMEL, vice president and treasurer of the Red Bank Oil Co., Houston, Tex., resigned effective September 1 to enter into business for himself.

W. A. REITER, geologist for Fohs Oil Co., Houston, Tex., delivered a paper on "Recent Research on the Origin of Petroleum" at the Houston Geological Society's weekly meeting the past week.

LLOYD LOCKRIDGE, of the Sinclair Refining Co., Wellsville, N. Y., has been elected a director of the Pennsylvania Grade Crude Oil Association. He succeeds HARRY L. LEWIS, of the Conewango Refining Co., of Warren, Pa., who resigned.

GEORGE W. MARTIN, formerly assistant general superintendent and safety supervisor for Dallas Gas Co., Dallas, Tex., has been promoted to general superintendent, succeeding R. M. REDDING who recently resigned because of ill health.

LOUIS N. BEAL, JR., R. B. THOMPSON and R. O. PEARSON, JR., have all been appointed junior engineers for Community Natural Gas Co., Dallas, Tex. Mr. Beal will be stationed at Abilene, Tex., Mr. Thompson at Corsicana, and Mr. Pearson at the southern zone of the Abilene division, Abilene.

DAVID S. FRANK, assistant chief combustion engineer of Pure Oil Co., Chicago, has been appointed to the special committee on direct-fired fluid heaters and boilers of the American Society of Mechanical Engineers.

DON A. MILLER, formerly production foreman for Phillips Petroleum Co., at Carmi, Ill., has been transferred to Oklahoma City, Okla., where he assumes duties as assistant to EARL GRIFFIN, district production superintendent.

PAUL PITZER, former president of the West Central Texas Oil and Gas Association, and his partner, C. K. WEST, both of Breckenridge, Tex., were last week appointed honorary colonels on the staff of Gov. John E. Miles, of New Mexico.

LATHAM G. YATES, instructor of petroleum engineering at University of Pittsburgh, has completed a research assignment for Phillips Petroleum Co. at Bartlesville, Okla., and will return to Pittsburgh, Pa., after a short vacation.

THOMAS G. CRAIG, district measurement superintendent with United Gas Pipe Line Co., has been transferred from New Iberia, La., to San Antonio, Tex. He is succeeded by BENJAMIN F. TUCKER, who has been promoted to his position in the Southwest Louisiana district.

EMILL OTT, geologist of San Angelo, Tex., and W. W. GRUBER and R. P. LYNN, both also of San Angelo, have formed the Three Widows Oil Co. The first venture of the firm is on land in San Saba County, Texas, from which the company derived its name, land owned by three widows.

MARSHALL MYERS, production engineer for Phillips Petroleum Co. at the Bartlesville, Okla., headquarters, has left the company to enlist in the U. S. Army as a second lieutenant. Promotion to first lieutenant is expected shortly.

Oil Man—Banker

When J. F. McManmon finished Princeton in 1921, following 4 years of civil engineering, football, and track, he headed straight to Oklahoma's oil fields. He found a market for his services with Sinclair during the development of the Burbank field in northern Oklahoma. It was not long, however, before Jim McManmon felt the urge to become an independent operator, and began the route so many before him had traveled—buying leases, then tools, then more tools, until he had become a full-fledged operator in his own right. His operations ranged over the entire Mid-Continent area of Kansas, Oklahoma, Arkansas, Texas, and Louisiana. In 1928 he drilled a gas well in Kansas. Then began a short but meteoric career as gas producer, pipe-line builder, and executive, and securities-company official, which took him to Kansas City, Chicago, and finally to Wall Street in New York. It was during this period that the Panhandle Eastern pipe line was conceived and built. He became an executive with this company and later, when Columbia Gas & Electric Co. purchased a half interest in Panhandle Eastern, Mr. McManmon resigned from his various executive positions and went to California for a year. He then returned to Tulsa to devote his time to his oil interests, which he had continued during his sojourn with the gas industry.

J. F. McMANMON

But again a change was in store for him. Early this year he joined the National Bank of Tulsa in an executive capacity. Since then he has been devoting his full time to the institution's oil and gas interests.

Jim is 41, a bachelor, and a golfer. He spends nearly all his Saturday afternoons in diligent (and sometimes expensive, he says) efforts to improve his score in the pastime.

J. M. CHARLTON, geologist with the California Co., has been transferred from Jackson, Miss., to San Antonio, Tex.

J. F. SNYDER, division land man, and R. M. GAWTHROP, division geologist with Exchange Oil Co., Jackson, Miss., have been called into the company's main New York offices.

GEORGE S. CAVANAUGH, for some time chief chemist in charge of the lubricants plant of the Pennzoil Co. of California, Los Angeles, has been elected vice president and director of the company.

G. L. GRELSFORD, Tyler, Tex., together with HORACE H. DURSTON, Fort Worth, Tex., and VERONICA T. HYLAND, New York City, has formed the Gerver Oil Co. with a capital stock of $125,000. It will be officed in Tyler, Tex.

P. H. JONES, research supervisor of Union Oil Co. at the Wilmington, Calif., refinery, discussed "Factors Influencing the Bond Between Cement and Formation" at the last monthly meeting of Los Angeles Basin chapter of the American Petroleum Institute.

E. G. VORWERK of Home Oil Co., Napoleon, Ohio, has been reelected president of the Northwest Ohio Oil Jobbers' Association. A. J. ALLER of Pearl Oil Co., Bowling Green, was named vice president and E. J. O'DONNELL of O'Donnell Oil Co., was elected secretary-treasurer.

T. G. (JACK) NICHOLS, independent oil man of Amarillo, Tex., and his wife and two daughters have returned from a 6-week trip to Alaska. While there they visited a short while with a big-game hunting party from Amarillo which has been in Alaska for several weeks. The hunters are WALTER HOLMES, independent producer; JACK BERRY, and GENE HOWE, president of the Amarillo News-Globe.

Shifts: J. F. DARBY, president, Darby-Lynde Co., from La Jolla, Calif., to Muskogee, Okla.; HAROLD DECKER, superintendent, Seaboard Oil Co., from Dallas, Tex., to Corpus Christi, Tex.; GEORGE BUNDRETT, engineer, Fain-McGaha Oil Corp., from Wichita Falls, Tex., to Langley Field, Va.; C. N. VALERIUS, geologist, Barnsdall Oil Co., from El Dorado, Ark., to Jay, Okla.; IVAN J. FENN, geologist, Subterrex Co., from Salem, Ill., to Houston, Tex.; F. C. HENDERSON, president, Agua Dulce Co., from Saranac Lake, N. Y. to New York City; THOMAS B. SCOTT, JR., manager, Brookhaven Oil Co., from Long Island, N. Y., to Tulsa; JOHN W. HERBERT, vice president, Herbert Oil Corp., from Southampton, Long Island, N. Y., to Fort Worth, Tex.; OSCAR COOPER, president. North-South Oil Co., of New York, from New York City, to Abilene, Tex.; J. E. BACKMAN, geologist, Gulf Research & Development Corp., from Pittsburgh, Pa., to Ardmore, Okla.; CLIFFORD MOOERS, president, Shasta Oil Co., from Seattle, Wash., to Houston, Tex.; L. L. SMITH, superintendent, Continental Oil Co., from Glenrock, Wyo., to Denver, Colo.; BOB O. BIRD, superintendent, Phillips Petroleum Co., from Wewoka, Okla., to Okemah, Okla.; K. R. NEAL, vice president, Raymond Oil Co., from Miami, Okla., to Ada, Okla.; MOTT SOUDERS, JR., engineer. Shell Development Co., from Wilmington, Calif., to San Francisco, Calif.

NEIL BREEN, vice president of the Sylvestre Oil Co., and star golfer of the Esso organization, took the Bert Squires Oil Trades golfing tournament held last week at the Pelham Country Club, in New York City. Mr. Breen is also the favorite in the coming Fuel Oil Association tournament which will be held later this month.

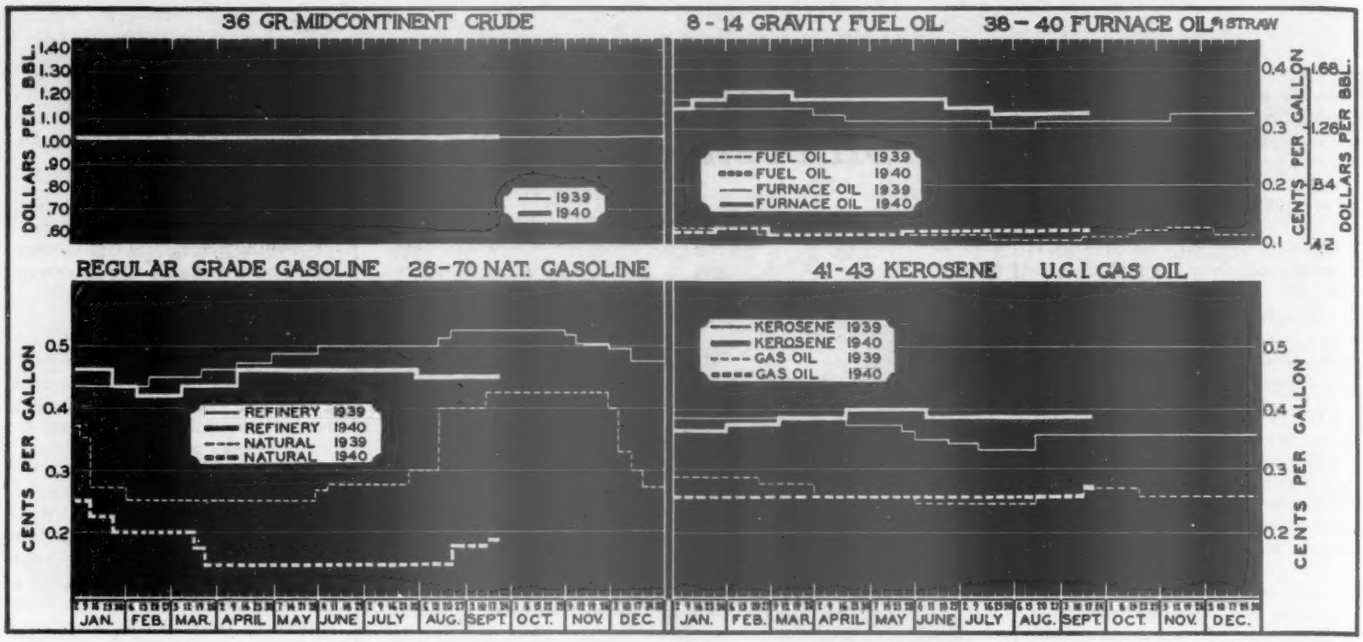
J. C. B. VAN DEN BERG, equipment engineer of De Bataafsche Petroleum Maatschappij, has arrived in Houston, Tex., where he will maintain an office in the Shell Building. Mr. van den Berg will act as liaison engineer for the B.P.M. with respect to new developments in drilling and production equipment and methods.

JOSEPH E. PATTERSON, with Mrs. Patterson and children, recently returned to Petrolia, Ont., Canada, from Trinidad, British West Indies, where Mr. Patterson has spent 3 years drilling for a British syndicate.

CYRIL K. MORESI, formerly Louisiana state geologist and associated with the Department of Conservation, has resigned and is now engaged in consulting work with offices in the Carondelet Building, New Orleans, La.

WILLIAM WHITE has returned to Canada from Negritos, Peru, where he has been employed for 18 years with the International Petroleum Co. He and his family will make their permanent home in Petrolia, Ontario.

RAY WILLIAMS, Topeka, Kans., member of the staff of T. A. MORGAN, conservation director of Kansas, has been appointed official representative of the Kansas Corporation Commission to the Kansas Oil Scouts Association.



Representative Mid-Continent Quotations on Crude Oil and Refined Products, Basis Oklahoma (Group 3)

Natural Gasoline Market Rallies on Strength of Group 3 Shipments

By H. STANLEY NORMAN

NATURAL-GASOLINE producers in the Southwest have increased their prices by one-fourth to three-eighths of a cent in the past few days. Northern and eastern refiners and jobbers are currently producing more volatile motor fuels required for winter automobile operation. More liberal use of natural gasoline in producing winter-grade motor fuels has stimulated movement from Oklahoma and Texas plants to the highest level in months.

The rapidity with which the natural-gasoline market has reacted to the heavier demand maintains its record as being one of the most sensitive of petroleum products. The market has gained one-half to three-fourths of a cent during the past 3 weeks and plant operators were discussing the probability of further advances in the near future.

Selling Incentive Limited

The base quotation of 2 cents for 26-lb. natural gasoline in Oklahoma for interstate shipment to Indiana and Illinois refineries was considered the minimum at which prompt business can be transacted. Plant operators are reluctant to make unrestricted shipments on the rising market, preferring to wait until the winter motor-fuel producing season becomes more advanced.

The bulge in natural-gasoline demand from the Corpus Christi district was attributed largely to coastwise motor-fuel business, although some reports were heard that a cargo or two of low-grade aviation fuel had been sold there to Japanese buyers. More abundant use of natural gasoline is one of the compromises available for escaping the export licensing regulations.

The light-fuel-oil market is gaining momentum with each passing day of September. Operation of furnaces on a part-day schedule has started in most of the northern cities. Oklahoma, Louisiana, and most Texas refiners have advanced their tank-car prices on light fuel oil by one-eighth to one-fourth of a cent per gallon. U.G.I. gas oil in Oklahoma is quoted at a range of 2¾ to 3 cents.

The advance in light-fuel-oil prices has had no apparent tendency to discourage placement of shipping instructions by contract customers. Inquiries for over-the-winter contracts are appearing in the Group 3 market with increasing frequency, confirming the universal prediction that this winter's fuel-oil demand will exceed all previous records.

Heavy fuels, acceptable for operation of the larger-type burners in factories, hotels, apartment buildings and public institutions, are in strong demand in the Chicago district.

For the present at least, Group 3 refiners prefer to sell sparingly on the spot fuel-oil market. Sales are resisted beyond the extent that individual conditions dictate from a standpoint of storage facilities. There is little doubt, in the opinion of refiners, that light fuels particularly and all grades in general will move forward probably with a rush as soon as the first protracted cold weather develops in the consuming districts.

Motor Fuel Unchanged

The motor-fuel market in general is unchanged. Rumors continue that shipments are being made from Group 3 plants at less than quoted prices, but this condition has existed for several months. Refiners report that movement to middle western jobber customers is holding at approximately the levels obtaining in August and that modest reductions in storage can be expected to continue.

Oklahoma refiners continue to quote motor fuel at a range of 3½ to 4¾ cents at the plants, but these prices can be shaded in a few directions. The concessions below general quotations are not substantial but are sufficient to hold the market under constant pressure.

There have been no reports in recent weeks of extensive interrefinery buying, although the few major marketers who have drawn on independent sources all summer have not changed their policies. Most of the routine business between the independent suppliers and the major marketers is handled on contract basis supplemented during the height of the consuming season by open-market purchases. The need for supplementing normal supplies by open-market buying is gradually declining and may be expected to recede still further as the winter season encroaches.

Refined Oil Market Barometer

Strength of the fall fuel-oil market is gradually spreading from the Middle West to inland refining centers and from North Atlantic states to the Gulf Coast. Natural-gasoline prices have gained from one-half to three-eighths of a cent. Wax prices have rallied on the Atlantic Coast.

MID-CONTINENT. Motor-fuel movement continues unchanged with rumors that quoted prices can be shaded.

GULF COAST. The trend of improvement in the light-fuel-oil market was extended this week. Gasoline lifeless.

CALIFORNIA. Gasoline and fuel-oil demand satisfactory at unchanged prices. Natural gasoline slightly firmer.

PENNSYLVANIA. Cylinder-oil prices were reduced 1 cent per gallon. Wax moving freely.

CHICAGO. All grades of fuel oil in brisk demand, with prices tending higher.

Motor-Fuel Market Weakness Spreading on Eastern Coast

By J. P. O'DONNELL

NEW YORK, Sept. 17.—Reductions of gasoline tank-car and tank-wagon prices that had their inception in the New York and New England area 2 weeks ago were extended further last week. Both were reduced at a number of both eastern and western Pennsylvania points following reductions in all neighboring states.

The latest reductions were made by the Atlantic Refining Co., which lowered both tank-car and tank-wagon prices 0.5 cent at several points. Points in eastern Pennsylvania where the price was already subnormal such as Philadelphia where the tank-car price was 7 cents escaped the general reduction but prices elsewhere were cut to 7.5 cents. The reduction in tank-wagon prices at Philadelphia and Wilmington, Del., dropped them to 8 cents, the lowest in the area. All these changes were effective September 12.

In Boston, where substantial price concessions were a large contributing factor to the widespread decline, there was some evidence of a return to more normal conditions and the tank-wagon price was raised 0.5 cent on September 7. The northeastern territory has shown more fluctuations than any other this year.

Gasoline prices in the New York area were reported unchanged though under pressure. There was some shading in prices reported but major suppliers continued to quote prices that had been in effect. The pressure that was exerting a depressing influence on the gasoline market was a result of the heavy inventories. Stocks of gasoline increased 154,000 bbl. in the East Coast area in the first week of September despite the inclusion of the Labor Day week end. The addition was a minor one but came in a week when withdrawals normally would be expected and followed an increase of 403,000 bbl. in the previous week. It was the first time this season that stocks rose in consecutive weeks. The increase for the 2 weeks aggregated 557,000 bbl. and lifted stocks to 21,930,000 bbl. or 1,724,000 bbl., equivalent to 8.5 per cent, above stocks on a comparable date of a year ago.

Despite the imminence of the fuel-oil-consuming season, prices have failed to exhibit any reaction so far. The arrival of cooler weather has reportedly stimulated demand slightly but the only effect so far has been a slightly firmer price basis. Both kerosene and No. 1 fuel oil are holding firm at 4.8 cents with 0.01 cent concessions for barge-lot shipments.

That Mexican fuel oil will be a factor in supplying the East Coast market this year was indicated last week when marine interests reported expectations of moving "a fair amount of heating oil from Mexico to North Atlantic ports this winter." Last week the 9,500-ton tanker, Hoegh Giant, arrived in New York from Mexico with a cargo of 116,000 bbl. of fuel oil en route for Stamford, Conn. According to marine reports it was the largest tanker to pass up the East River in years.

Because of the fact that there are large stocks of both light and heavy fuel oil on the East Coast with storage facilities at ports reported taxed to the limit, the Gulf-to-north-of-Hatteras movement of tankers this year may be delayed with the consequence that the factor of tanker rates might be lessened. Last year tanker rates recorded a 9.3-cent average increase in September but this year with half the month already gone, they have shown no change from late August levels. Current rates are 19 cents for clean and 18 cents for dirty tonnage. The market remains dull and no fixtures were reported during the past week.

Stocks of fuel oil have been accumulating on the East Coast throughout the summer and are now at the highest level on record. Further substantial additions were made in the first week in September and gas oil and distillate-fuel stocks reached 17,232,000 bbl., up 377,000 bbl. from the week before. This total compares with 12,885,000 bbl. a year ago, an increase of almost 34 per cent.

Major cause of the increased inventories of fuel oil on the East Coast this year has been a maintenance of high runs and an increase in light-fuel-oil yield. Through the first 7 months of this year the yield of distillate fuel oil at eastern refineries has averaged better than 4 per cent above last year as is shown in the accompanying table.

With ample supplies of fuel oil available in the eastern area, the comparative firmness of the market here is regarded as a reflection of the strength that is reported from the Gulf Coast. Some fears are being entertained regarding the local market if a strong demand does not develop in the immediate future. Observers view the present period with stocks at a peak and the heavy consuming period still some time away as a critical one for fuel oil.

DISTILLATE FUEL-OIL YIELD

Month—	Per cent 1940	Per cent 1939	Increase
January	21.2	19.1	2.1
February	22.1	20.8	1.3
March	20.2	16.2	4.0
April	21.5	15.5	6.0
May	17.5	13.4	4.1
June	18.2	13.1	5.1
July	19.3	13.1	6.2

The wax market, which showed signs of a revival in the first week of September, was reported unchanged last week. While domestic demand was reported to be fair, prices were said to be sustained at the higher levels of the past 2 weeks chiefly as the result of limited offerings. The advances pertained only to crude scale wax with fully refined grades holding at former levels.

Prices of both diesel fuel oil and Bunker C fuel oil remained unchanged with diesel oil quoted at

(Continued on Page 239)

Gulf Coast Markets

HOUSTON, Tex., Sept. 17.—Gulf Coast refinery markets continued to mark time the past week, maintaining a status quo position that has existed for several weeks. There was nothing to indicate any improvement in any product but at the same time no further weakness was displayed. All prices seemed fairly well pegged for the time being, gasolines in particular.

Sales of both heavy and light fuels and burning oils still are limited to occasional cargoes, but anticipated heavy seasonal demand is preventing any serious weakening or slipping of prices anywhere in the lineup. When a cargo of any of these products is sold, suppliers generally tighten up on their respective quotations, only to ease up a little when a few days go by without a sale. Quotations for Bunker C fuel continue to run between 80 and 85 cents. In view of the prospective seasonal demand, it is not likely there will be any shading of the 80-cent low.

Supplies of fuels of various grades are reported as being not too plentiful on the Gulf Coast despite the fact that there has been no large demand so far. For this reason coastal sellers are entering the season of heavy demand in unusually good position.

Some slowing up of domestic movement of gasoline taken out on contracts was being felt by coastal refiners during the week. This is causing some additional backing up of material, but for the most part sellers long have given up any attempt to push sales, and despite the pres-

(Continued on Page 239)

A.P.I. Weekly Refinery Statistics

Week Ended September 14, 1940

East Coast	100.0	21,616,000	12,637,000	17,552,000	605,000
Appalachian	91.0	3,276,000	566,000	510,000	114,000
Ind., Ill., and Ky.	90.2	13,803,000	3,430,000	5,713,000	538,000
Okla., Kans., and Mo.	76.9	6,174,000	2,182,000	1,682,000	277,000
Inland Texas	59.6	1,568,000	1,533,000	391,000	123,000
Texas Gulf	85.3	10,521,000	7,625,000	7,370,000	818,000
Louisiana Gulf	97.6	2,597,000	1,683,000	1,178,000	116,000
N. Louisiana and Ark.	51.5	488,000	523,000	323,000	46,000
Rocky Mountains	56.0	891,000	512,000	118,000	55,000
California	87.3	15,376,000	76,304,000	10,176,000	523,000
Total reported	85.3	76,310,000	106,995,000	45,013,000	3,215,000
Est. unreported	.....	6,990,000	2,140,000	1,635,000	365,000
*Est. total	.....	83,300,000	109,135,000	46,648,000	3,580,000
*Est. total previous wk.	.....	84,294,000	108,080,000	45,505,000	3,500,000
*September 15, 1939	.....	71,753,000	114,979,000	37,848,000	3,470,000

*Bureau of Mines basis.

Stocks of Crude Oil in the United States

(BUREAU OF MINES ESTIMATE)

Week ended September 7, 1940	262,716,000 barrels
Week ended August 31, 1940	265,865,000 barrels
Week ended September 9, 1939	233,826,000 barrels

Figures do not include stocks of heavy, unrefinable California crude.

Retail Oil Markets

Tank-wagon and filling station prices on gasoline and kerosene furnished by the larger marketing firms

Prices as of September 17, 1940

Taxes

The gasoline quotations given in the following tables include the 1½-cent federal tax, as well as state, county, and city taxes. The gasoline is the regular or standard grade. In most areas lower grades and a premium grade also are available.

Standard Oil Co. (Indiana)

	Gasoline Tank wag.	Gasoline Dlr.	Gasoline Incl. tax	Kero. tank wag.
Chicago, Ill.	15.6	13.6	4.5	10.0
Decatur	14.6	13.1	4.5	9.5
Joliet	15.6	14.1	4.5	10.0
Peoria	15.6	13.2	4.5	10.0
Quincy	15.4	13.9	4.5	9.8
Davenport, Ia.	15.6	14.1	4.5	‡10.0
Des Moines	15.4	13.9	4.5	‡9.8
Mason City	15.8	14.3	4.5	‡10.2
Duluth, Minn.	16.4	14.9	4.5	10.8
Mankato	16.0	14.5	4.5	9.0
Minneapolis	16.0	14.2	4.5	10.4
LaCrosse, Wis.	17.0	15.5	5.5	10.4
Green Bay	17.4	15.9	5.5	10.3
Milwaukee	16.8	15.3	5.5	10.2
Detroit, Mich.	14.1	12.6	4.5	7.6
Grand Rapids	13.2	11.2	4.5	9.0
Saginaw	14.9	13.4	4.5	9.1
Evansville, Ind.	16.6	15.1	5.5	†9.8
Indianapolis	16.8	14.8	5.5	†10.0
South Bend	16.8	15.3	5.5	†10.0
Fargo, N. D.	18.2	16.7	5.5	11.6
Huron, S. D.	17.5	16.0	5.5	10.9
Kans. City, Mo.*	14.8	13.3	4.5	8.0
St. Louis*	15.2	13.2	4.5	9.0
St. Joseph	14.9	13.0	4.5	7.9
Wichita, Kans.	13.8	12.3	4.5	7.0

*State tax 2 cents, 1-cent city tax, and 1½-cent federal tax. †Does not include 4-cent state tax. ‡Does not include 3-cent state tax.

Exclusive of state general sales taxes.

Discounts to commercial consumers: On purchases per month off tank-wagon prices: 1,000 gal. or more, 1.5 cents off; minimum delivery 25 gal.

Stanolex Fuel Oil in Chicago

Effective Sept. 3, 1940, f.o.b. Chicago, tank-wagon prices: Standard heater oil, 1-99 gal., 8.75 cents; 100-149 gal., 7.75 cents; 150 gal. and over, 7.25 cents. Stanolex fuel oil No. 1, 1-99 gal., 8.5 cents; 100-149 gal., 7.5 cents; 150-399 gal., 7 cents; 400 gal. and over 6.5 cents. Stanolex furnace oil, 1-99 gal., 8.5 cents; 100-149 gal., 7.5 cents; 150-399 gal., 7 cents; 400 gal. and over, 6.5 cents. Stanolex fuel oil A, 1-399 gal., 5.75 cents; 400-799 gal., 4.75 cents; 800 gal. and over, 4.5 cents. Stanolex fuel oil B, 1-399 gal., 5.75 cents; 400-799 gal., 4.75 cents; 800 gal. and over, 4.5 cents. Stanolex Bunker C fuel oil, 1-999 gal., 4.5 cents; 1,000 gal. and over, 3.5 cents.

Ohio

STANDARD OIL CO. OF OHIO

	Gasoline Cons'r tank wag.	Gasoline Divided dlr.	Gasoline Incl. tax	Kero. tank wag.
Ohio points	16.0	15.0	5.5	*9.0

*Includes state tax of 1 cent.

Atlantic Coast District

STANDARD OIL CO. OF NEW JERSEY

	Gasoline Cons'r tank car	Gasoline Dlr. tank wag.	Gasoline Incl. tax	Kero. tank wag.
Atl'tic, City, N. J.	12.1	13.2	4.5	7.4
Newark	12.1	13.2	4.5	7.4
Annapolis, Md.	13.85	14.85	5.5	9.5
Baltimore	13.25	14.25	5.5	8.5
Cumberland	14.65	16.65	5.5	10.0
Wash'gton, D. C.	11.50	12.50	3.5	9.5
Danville, Va.	15.45	17.95	6.5	11.0
Norfolk	14.25	16.75	6.5	10.5
Petersburg	14.55	17.05	6.5	11.2
Richmond	14.55	17.05	6.5	10.5
Roanoke	15.75	18.25	6.5	11.0
Charles'n, W. Va.	15.05	17.55	6.5	12.6
Parkersburg	14.35	15.85	6.5	11.2
Wheeling	15.35	17.25	6.5	11.8
Charlotte, N. C.	17.40	17.50	7.5	11.8
Hickory	17.95	19.45	7.5	12.3
Mt. Airy	17.80	19.30	7.5	12.2
Raleigh	17.15	16.50	7.5	11.5
Salisbury	17.45	16.50	7.5	11.9
Charleston, S. C.	15.25	17.75	7.5	9.75
Columbia	16.10	18.60	7.5	11.5
Spartanburg	16.80	19.30	7.5	12.7

Price basis to Essolene undivided dealers: Dealer tank-wagon price less 0.5 cent per gallon. Price basis to commercial consumers, effective March 8, 1937, in Maryland, District of Columbia, and in Arlington and Fairfax counties in Virginia; and March 12 in New Jersey: To contract accounts purchasing at least one full compartment at a time by hose connection, on yearly purchases: From 2,500 to 100,000 gal., consumer tank-wagon price at time and place of delivery; 100,000 gal. per year, consumer tank-car price plus 0.5 cent per gallon. Consumer tank-wagon price generally will be equivalent to dealer tank-wagon price less 0.5 cent per gallon.

Effective January 16, 1939, in North Carolina the commercial consumer schedule became as follows: Single deliveries of 50 gal. or more, consumer tank-wagon price. Single deliveries of less than 50 gal., 4 cents per gallon over consumer tank-wagon price. Generally the posted consumer tank-wagon price will be equivalent to the dealer price, less 0.5 cent per gallon. The above policy also applies in South Carolina, effective January 23, 1939.

Southern District

STANDARD OIL CO. (KENTUCKY)

	Gasoline Cons'r tank wag.	Gasoline Net dlr.	Gasoline Incl. tax	Kero. tank wag.
Atlanta, Ga.	15.0	15.0	7.5	10.0
Augusta	17.0	17.0	7.5	10.0
Macon	15.0	15.0	7.5	9.0
Savannah	16.0	16.0	7.5	9.0
Birmingham, Ala.	16.0	16.0	8.5	9.0
Mobile	15.5	15.5	9.5	8.0
Montgomery	18.5	18.5	9.5	10.0
Jackson, Miss.	16.0	16.0	7.5	9.0
Vicksburg	16.0	16.0	7.5	9.0
Jacksonville, Fla.	15.0	15.0	8.5	8.0
Miami	15.5	15.5	8.5	8.0
Pensacola	17.5	17.5	9.5	8.5
Tampa	15.0	15.0	8.5	8.0
Lexington, Ky.	14.5	14.5	6.5	9.5
Covington	14.5	14.5	6.5	9.5
Louisville	15.0	15.0	6.5	9.0
Paducah	14.0	14.0	6.5	9.0

Price basis to tank-wagon consumers, effective January 4, 1937, 3 cents per gallon below tank-wagon price.

Montgomery, Ala., has a county tax of 1 cent per gallon, and a city tax of 1 cent per gallon on gasoline, in addition to state tax, and 1 cent per gallon on kerosene. Mobile, Ala., has a city gasoline tax of 2 cents per gallon; Birmingham, Ala., has a city gasoline tax of 1 cent per gallon; Pensacola, Fla., has a city gasoline tax of 1 cent. All are included in the table.

Pennsylvania and Delaware

ATLANTIC REFINING CO.

	Gasoline Cons'r tank car	Gasoline Dlr. tank wag.	Gasoline Incl. tax	Kero. tank wag.
Philadelphia, Pa.	12.5	13.5	5.5	10.0
Pittsburgh	13.0	15.0	5.5	10.5
Allentown	13.0	14.5	5.5	10.5
Erie	13.0	15.0	5.5	10.0
*Scranton	12.5	14.25	5.5	10.5
Altoona	13.0	15.0	5.5	10.5
Dover, Del.		14.0	5.5	10.5
Wilmington		13.5	5.5	10.0

Price basis to undivided dealers, dealer tank-wagon price less 0.5 cent per gallon.

Discount on kerosene, 2 cents per gallon off tank-wagon price on tank-wagon deliveries of 25 gal. or more at one time.

*Voluntary discount of 1 cent allowed to dealers only.

Pacific Coast Territory

STANDARD OIL CO. OF CALIFORNIA

	Gasoline Tank truck	Gasoline Serv. sta.	Gasoline Incl. tax	Kero. tank wag.
San Francisco	16.5	17.5	4.5	11.5
Los Angeles	16.0	17.0	4.5	10.0
Fresno, Calif.	17.5	18.5	4.5	12.5
Phoenix, Ariz.	20.5	21.5	6.5	*17.5
Reno, Nev.	19.5	20.5	5.5	13.5
Portland, Ore.	19.0	20.0	6.5	13.5
Seattle, Wash.	19.0	20.0	6.5	13.5
Spokane	20.5	21.5	6.5	16.5
Tacoma	19.0	20.0	6.5	13.5

*Includes 5-cent state tax.

Discount to dealers: On gasoline, off tank-wagon price, to 100 per cent dealers, 3 cents. To commercial consumers: On tank-wagon price; on single deliveries of 40 gal. and over, advance quantity discount extended at time of delivery, 3 cents. Service-station schedule applies on single deliveries less than 40 gal. On kerosene in tank-car, transport-truck, and trailer delivery, 3 cents off tank-wagon price; plant deliveries to jobbers, 2.5 cents below tank wagon.

March 18, 1939, split dealer discount was canceled.

New York and New England

SOCONY-VACUUM OIL CO., INC.

	Gasoline Cons'r tank car	Gasoline Dlr. tank wag.	Gasoline Incl. tax	Kero. tank wag.
Albany	11.7	12.5	5.5	7.3
*Met. New York, Manhat., Bronx, Queens, Brklyn., Staten Island	11.8	13.0	5.5	7.6
Buffalo	12.6	13.6	5.5	7.5
Rochester	13.1	14.2	5.5	8.1
Syracuse	13.0	11.9	5.5	8.2
Portland, Me.	11.2	13.3	5.5	7.4
Manchester, N.H.	12.1	13.0	5.5	8.5
Burlington, Vt.	12.4	14.0	5.5	7.9
Boston, Mass.	10.2	10.5	4.5	7.7
Worcester	10.7	12.2	4.5	7.8
Hartford, Conn.	11.0	11.5	4.5	7.5
New Haven	10.9	10.0	4.5	7.0
Providence, R. I.	10.1	11.5	4.5	7.7

*Does not include 2 per cent city sales tax, which is calculated on basis of net retail price exclusive of state and federal taxes. Metropolitan New York prices are undivided dealer prices; others are split dealer.

Effective August 8, 1940, the company changed its commercial consumer policy in New York and New England to the following:

Full compartment deliveries: Accounts buying less than 20,000 gal. annually, 0.5 cent above the commercial-consumer price; accounts buying from 20,000 to 120,000 gal. annually, commercial-consumer price; accounts buying 120,000 gal. annually and above, 0.25 cent off consumer price. Split compartment deliveries: Delivery of less than a full compartment, 250 gal., commercial-consumer price plus 1 cent. Steel-barrel deliveries: Commercial price plus 3 cents.

Rocky Mountain District

CONTINENTAL OIL CO.

	Gasoline Tank wag.	Gasoline Incl. tax	Kero. tank wag.
Denver, Colo.	13.5	5.5	10.5
Grand Junction	16.5	5.5	12.5
Pueblo	15.5	5.5	9.0
Casper, Wyo.	16.5	5.5	11.5
Cheyenne	14.5	5.5	11.0
Billings, Mont.	17.5	6.5	12.0
Butte	15.5	6.5	13.0
Great Falls	17.5	6.5	12.0
Helena	15.5	6.5	12.5
Salt Lake, Utah	16.0	5.5	14.0
Boise, Idaho	18.6	6.5	16.0
Twin Falls	21.6	6.5	16.5
Albu'que, N. M.	16.0	6.5	9.5
Roswell	14.0	7.0	8.0
Santa Fe	17.0	7.0	9.5

*Includes city tax of 0.5 cent. †Includes state tax of 1 mill.

Tank wagon represents price to consumers. Dealer represents price to dealers. If no dealer price is quoted, the tank-wagon price applies to all classes of trade.

Central South District

STANDARD OIL CO. OF LOUISIANA

	Gasoline Cons'r tank car	Gasoline Dlr. tank wag.	Gasoline Incl. tax	Kero. tank wag.
New Orleans, La.	14.25	16.75	8.5	†11.0
Baton Rouge	15.25	17.75	8.5	‡10.5
Alexandria	15.25	17.75	8.5	‡10.5
Lafayette	15.50	18.00	8.5	‡10.0
Lake Charles	15.25	17.75	8.5	‡10.0
Shreveport	14.00	16.50	8.5	‡9.0
Knoxville, Tenn.	18.50	20.00	8.5	12.5
Memphis	16.50	18.00	8.5	11.0
Chattanooga	18.00	15.75	8.5	12.0
Nashville	17.50	16.50	8.5	11.5
Bristol	18.75	18.75	8.5	12.0

Essolene at dealer price less 0.5 cent per gallon to undivided dealers.

†Includes 1-cent parish tax and 1-cent state tax. ‡Includes 1-cent state tax.

Price basis to commercial consumers: Effective May 15, 1937, deliveries of 50 gal. or more in one territory take posted consumer tank-wagon price. Accounts taking deliveries of less than 50 gal. at one time pay posted consumer tank-wagon price plus 4 cents per gallon. Generally, the posted consumer tank-wagon price will be equivalent to the dealer price less 0.5 cent per gallon. Kerosene prices include 1-cent state tax.

Effective February 24, 1939, the company reestablished in New Orleans the commercial consumer policy on motor fuel effective in the rest of the state.

Effective December 12, 1938, the company revised its commercial consumer policy on motor fuel in New Orleans, as follows: Single deliveries of less than 50 gal., consumer tank car plus 2 cents per gallon 50 to 199 gal., consumer tank car plus 1 cent per gallon; 200 gal. and over, consumer tank car plus 0.5 cent per gallon.

Oklahoma and Arkansas

CONTINENTAL OIL CO

	Gasoline Tank wag.	Gasoline Incl. tax	Kero. tank wag.
Texarkana, Ark.	13.5	5.5	6.0
Fort Smith	15.0	5.5	7.0
Little Rock	16.0	8.0	8.0
Muskogee, Okla.	13.5	5.5	7.0
Oklahoma City	11.5	5.5	6.5
Tulsa	12.5	5.5	6.0

Tank wagon represents price to consumers. If no dealer price is quoted, the tank-wagon price applies to all classes of trade.

Nebraska

STANDARD OIL CO. OF NEBRASKA

	Gasoline Tank wag.	Gasoline Dlr.	Gasoline Incl. tax	Kero. tank wag.
Omaha	17.0	15.9	6.5	9.0
McCook	17.5	14.4	6.5	9.5
Norfolk	17.5	14.9	6.5	9.9
North Platte	17.8	15.0	6.5	10.2
Scottsbluff	18.4	15.5	6.5	10.5

Discounts to commercial consumers for tank-wagon deliveries covered only by standard commercial consumers contract, effective January 1, 1935.

Texas

	Gasoline Tank wag.	Gasoline Dlr.	Gasoline Incl. tax	Kero. tank wag.
Dallas, Tex.	11.5	15.5	5.5	6.0
Fort Worth	11.5	15.5	5.5	7.0
Houston	12.0	16.0	5.5	8.0
San Antonio	12.5	17.0	5.5	8.0

Canada*

3-Star Imperial Gasoline
IMPERIAL OIL, LTD.

	Gasoline Tank wag.	Gasoline Incl. tax	Kero. tank wag.
Halifax, N. S.	24.5	10.0	18.0
St. John, N. B.	24.5	10.0	18.0
Montreal, Que.	24.0	8.0	16.5
Toronto, Ont.	24.5	8.0	17.0
Hamilton, Ont.	24.5	8.0	17.0
Winnipeg, Man.	27.5	7.0	22.5
Brandon, Man.	28.0	7.0	22.5
Regina, Sask.	25.0	7.0	20.0
Saskatoon, Sask.	28.0	7.0	23.0
Edmonton, Alta.	25.9	7.0	20.0
Calgary, Alta.	23.0	7.0	18.0
Vancouver, B. C.	21.0	7.0	23.0

*Imperial gallon used in Canada.

Divided dealers pay tank-wagon prices. Discount to undivided dealers, 1 cent below tank-wagon price. In maritime provinces both divided and undivided dealers pay tank-wagon price.

Tank-Wagon Changes

Atlantic Refining Co. reduced dealer tank-wagon gasoline prices 0.5 cent September 12 at Philadelphia, Allentown, Altoona, Pa., and Wilmington, Del. The company reduced tank-car prices 0.5 cent at Pittsburgh, Allentown, Erie, and Altoona.

Standard Oil Co. of Nebraska reduced tank-wagon price on gasoline 0.5 cent August 16 at Norfolk, Neb.

Standard Oil Co. (Kentucky) reduced the consumer tank-wagon and dealer gasoline price 1 cent August 27 at Atlanta, Ga. On August 30, the tank-car and dealer price was lowered 2 cents at Macon, Ga. Consumer and dealer tank-wagon prices were reduced 0.5 cent at Mobile, Ala., August 30, and were lowered 1.5 cents the same date at Paducah, Ky. The Covington, Ky., consumer tank-wagon and dealer price was reduced 0.5 cent on September 7. Prices were reduced 0.5 cent at Jackson, Miss., and Jacksonville, Fla., August 30. The consumer tank-wagon price at Tampa, Fla., was reduced 3.5 cents and the dealer quotation 0.5 cent August 29.

Continental Oil Co. reduced regular gasoline 1 cent at Grand Junction, Colo., August 23 and lowered the price 2 cents at Boise, Idaho, September 3.

Standard Oil Co. (Indiana) reduced tank-wagon gasoline 0.5 cent September 10 at Grand Rapids, Mich. Effective September 7, the company reduced tank-wagon consumer and dealer prices at Kansas City, Mo., 0.1 cent.

Prices of Refined Products

All quotations f.o.b. plant in cars for interstate or export movement except as otherwise noted.

Prices as of September 17, 1940

The quotations are exclusive of the federal excise taxes of 1 cent a gallon on gasoline and 4 cents a gallon on lubricating oils. Octane ratings in Middle West, Mid-Continent, and Southwest are based on A.S.T.M. method of testing.

Refinery Gasoline

OKLAHOMA (Group 3)—

U. S. Motor grades:		
72-74 octane (regular)	.04½	.04¾
63-66 octane	.04	.04¼
60 octane and below	.03½	.03¾
60-62 400 grades:		
72-74 octane (regular)	.04½	.04¾
63-66 octane	.04	.04¼
60 octane and below	.03½	.03¾

NORTH TEXAS—

U. S. Motor grades:		
72-74 octane (regular)	.04½	.04¾
63-66 octane	.04	.04¼
60 octane and below	.03½	.03⅞
60-62 400	.03½	.03⅞

NORTH LOUISIANA (Ark. and N. La. delivery)—

U. S. Motor grades:		
72-74 octane (regular)	.04¾	.05
63-66 octane	.04¼	.04½
60 octane and below	.03⅞	.04⅛

ARKANSAS (Ark. and N. La. del.)—

U. S. Motor grades:		
72-74 octane (regular)		.04¾
60 octane and below		.04

CHICAGO (Based on Group 3)—

U. S. Motor grades:		
72-74 octane (regular)	.04⅝	.04⅞
63-66 octane	.04¼	.04½
60 octane and below	.03⅞	.04⅛
60-62 400 grades:		
72-74 octane (regular)	.04⅝	.04⅞
63-66 octane	.04¼	.04½
60 octane and below	.03⅞	.04⅛

PENNSYLVANIA (inland refineries)—

74-76 octane (regular)		.06
72-74 octane		.05¾

CALIFORNIA (domestic movement)—

58-60 400, 65 oct. and higher	.05½	.07¼
54-58 U. S. Motor	.05	.06¼

EAST COAST (domestic)—

U. S. Motor grades:		
New York (Bayonne)*	.05¾	.06½
Philadelphia	.05½	.06½
Boston	.05½	.06
Baltimore	.05½	.07
Charleston, S. C.	.06	.07

*All grades of gasoline ⅛ to ¼ cent less for barge shipments. New York Harbor prices are for New York and New England delivery. Prices for New Jersey delivery ¼ cent lower.

GULF COAST (domestic)—

U. S. Motor grades:		
72-74 octane	.03⅞	.04⅛
70-72 octane	.03⅞	.04
68-70 octane	.03¾	.04
65-67 octane	.03¾	.04

Natural Gasoline

OKLAHOMA (Group 3)—

Grade 26-70		.02
Grade 18-55	.02¼	.02⅜

NORTH TEXAS—

Grade 26-70		.01¾
Grade 18-55	.02	.02⅛

CALIFORNIA—

75-85 375-390	.04½	.05¼

NORTH LOUISIANA (Ark. and N. La. delivery)—

Grade 26-70		.01⅞

Tractor Fuel

OKLAHOMA (Group 3)—

40-42 gr., 315-325 i.b.p., 110-flash, 540-550 e.p.	.03½	.03⅝
41-43 gr., 300-320 i.b.p., 110-125 flash, 500-520 e.p.	.03⅝	.03¾
46-48 gr., 210-230 i.b.p., 480-max., e.p.	.03⅞	.04

Kerosene

(All kerosene water white)

OKLAHOMA (Group 3)—

42-44	.03⅞	.04
41-43	.03¾	.03⅞

NORTH TEXAS—

41-43	.03¾	.03⅞

NORTH LOUISIANA (Ark. and N. La. delivery)—

41-43	.03¾	.04

ARKANSAS (Ark. and N. La. del.)—

41-43		.04¼

PENNSYLVANIA (inland refineries)—

46	.04⅞	.05
45	.04¾	.04⅞

CHICAGO (Based on Group 3)—

42-44	.04	.04¼
41-43	.03⅞	.04⅛

CALIFORNIA (Pac. Coast market)—

38-43 high burning test	.04½	.05½

NEW YORK (Bayonne, N. J.)—

41-43		.048

GULF COAST (domestic)*—

41-43	.03⅞	.04

*Barge price ⅛ cent lower.

Furnace Oil

OKLAHOMA (Group 3)—

Range oil	.03½	.03⅝
No. 1 prime white, 38-42	.03⅝	.03½
No. 1 straw, 38-40	.03¼	.03⅜
No. 2 straw, 32-36	.03¼	.03⅜
No. 3 zero to 10, 28-32	.03⅛	.03¼

NORTH TEXAS—

No. 1 prime white, 38-42		.03½
No. 1 straw, 38-40		.03⅝

NORTH LOUISIANA (Ark. and N. La. delivery)—

No. 2, 32-36	.03	.03⅛

ARKANSAS (Ark. and N. La. del.)—

No. 2, 32-36	.03¼	.03½

CHICAGO (Based on Group 3)—

Range oil	.03½	.03¾
No. 1 prime white, 38-40	.03⅝	.03⅞
No. 2 straw, 32-36	.03½	.03½
No. 3, zero to 15, 28-32	.03⅛	.03⅜

NEW YORK (Bayonne, N. J.)—

*No. 1		.048
*No. 2		.041
*No. 4		.041

Barge deliveries ⅛ to ¼ cent under above tank-car price.

Gas Oil and Fuel Oil

(Gas oil per gal., fuel oil per bbl.)

OKLAHOMA (Group 3)—

U.G.I. gas oil, under 35	.02¾	.03
No. 5, low pour point, 18-22	.72½	.77½
No. 6, 15 and above, 8-14	.50	.55

NORTH TEXAS—

U.G.I. gas oil, under 35	.02⅝	.02¾
No. 5 low pour point, 18-22	.72½	.77½
No. 6, 15 and above, 8-14	.50	.55

NORTH LOUISIANA (Ark. and N. La. delivery)—

10-14 fuel oil, industrial		.70

CHICAGO (Based on Group 3)—

U.G.I. gas oil	.02¾	.03
No. 5, low pour point, 18-22	.75	.80
No. 5, 15 and above, 18-22	.60	.70
No. 6, low pour point, 10-16	.60	.70
No. 6, 15 and above, 8-14	.50	.55

PENNSYLVANIA (inland refineries)—

36-40		.04

CALIFORNIA—

Los Angeles:		
30-40 gas oil, per bbl.	1.10	1.25
24 plus diesel, per bbl.	1.10	1.25
24 plus diesel (bunkers)	1.20	1.35
12-16 (bunkers at tidewater)	.75	.90
10-16 (cargo lots)	.65	.90
12-17 (tank cars)	.60	.75
10-17 (high sulfur)	.50	.65
San Joaquin Valley:		
10-18 (tank cars)	.50	.70
24 plus diesel, per bbl.	1.10	1.25
San Francisco:		
24 plus diesel, per bbl.	1.35	1.40
24 plus diesel (bunkers)	1.40	1.50
10-16 (bunkers)	.80	.85

GULF COAST—

No. 2 fuel	.03⅜	.03¾
43-47 diesel	.03⅛	.03⅜
48-52 diesel	.03⅛	.03⅜
53-57 diesel	.03¼	.03¾
58-and-above diesel	.03¾	.04
Diesel bunkers		1.50
Bunker C (bulk cargoes)	.85	.90
Bunker C (bunkers)	.80	.85

NEW YORK (Bayonne, N. J.)—

27 plus, gas oil		.041
28-30 diesel (lighterage 6¼c per bbl.)		1.70
28-30 diesel (tank cars)		.041
Bunker C (to ocean-going ships in N. Y. Harbor	1.15	1.25
Industrial fuel (tank cars)	.033	.0385

Lighterage charge 5c bbl. additional.

Bright and Steam Refined

OKLAHOMA (Group 3)—

200-210 D, 10-25		.18
150-160 D, 0-10		.13½
150-160 D, 10-25		.13
100-110 D, 0-10		.13
100-110 D, 10-25		.12½
Steam refined:		
600 dark green (untreated)		.07

PENNSYLVANIA—

Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash):		
10 pour point		.14½
15 pour point		.13½
25 pour point	.12	.14
Steam refined:		
600	.07	.08
650	.08	.10
600 flash	.09	.11
630 flash	.11	.13

Neutral Oil

(Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—

0-10 pour point:		
150-3		.08
180-3		.08½
200-3		.08½
250-3		.10
280-3		.10½
280-4		.10
300-3½		.11
350-3½		.11½
400-3½		.12
500-3½		.12½
600-3½		.13
100-2½ paraffin oil, 10-25		.05¼
10-25 pour point:		
200-3		.08
250-3		.09½
280-3		.10
280-4		.09½

GULF COAST—

Pale oils:		
100-3	.05⅛	.05¼
200-3	.07⅛	.07¼
300-3	.07½	.07⅝
500-3½	.08¼	.08½
750-3½	.08⅝	.08¾
1,200-3½	.08¾	.08⅞
2,000-4		.09
3,000-4		.10½
Red oils:		
200-5-6	.06⅞	.07
300-5-6	.07¼	.07½
500-5-6	.08	.08¼
750	.08⅝	.08½
1,200-5-6	.08½	.08⅝

CALIFORNIA (moving to dom. market)

Pale oils:		
100-2½-3	.07¼	.08
200-2½-3	.07¼	.08
300-2½-3	.07¼	.08
400-3-4	.07¼	.08
450-3-4	.07¼	.08
550-3-4	.09	.11
600-3-4	.09	.11
Red oils:		
200-4-5	.07¼	.08
300-5-6	.07¼	.08
350-5-6	.09¼	.11½
400-5-6	.09¼	.11½
450-5-6	.09¼	.11½
500-5-6	.09¼	.11½
600-5-6½	.09¼	.11½
700-6½ plus	.09¼	.11½
750-6½ plus	.09¼	.11½
900-6½ plus	.09¼	.11½

PENNSYLVANIA—

150 vis., at 70° F., 3 color, 400-405 flash.		
Zero pour point		.22½
10 pour point		.21½
15 pour point		.20½
25 pour point	.19	.20
200 vis. at 70° F., 3 color:		
Zero pour point		.24½
10 pour point		.23½
15 pour point		.22½
25 pour point	.21	.22

Wax and Petrolatum

(Prices per pound)

OKLAHOMA (Group 3)—

124-126 (A.m.p.) w.c. scale	.02½	.03

PENNSYLVANIA (inland refineries)—

122-124 (A.m.p.) w.c. scale	.02¼	.02½
124-126 (A.m.p.) w.c. scale	.02¼	.02½

NEW YORK—

Wax in bags fully refined:		
125-127 (A.m.p.) wax		.0560
128-130 (A.m.p.) wax	.0560	.0570
130-132 (A.m.p.) wax		.0585
133-135 (A.m.p.) wax		.0615
135-137 (A.m.p.) wax		.0640
Crude scale:		
124-126 (A.m.p.) w.s.	.02¼	.02½
124-126 (A.m.p.) y.s.	.02¼	.02½
Petrolatum in barrels, carload lots:		
Dark green	.02125	.02625
Amber	.02375	.02875
Extra amber	.02625	.03000
Lily white	.04375	.05125
Snow white	.05125	.06000
Cream	.03375	.04125

Export Prices

GASOLINE

GULF COAST—

U. S. Motor	.03⅞	.04
60-62 400	.03⅞	.04½
61-63 390	.03⅞	.04½
64-66 375	.03⅞	.04½

LOS ANGELES—

U. S. Motor grades:		
Above 69 octane	.06¼	.06½
65-69 octane	.05¾	.06¼
60-65 octane	.05¼	.05¾

KEROSENE

GULF COAST—

41-43 water white		.04

LOS ANGELES—

41-43 water white	.05	.05¼

LUBRICANTS

(Pennsylvania Grade)

NEW YORK (f.o.b. in bbl.)—

Cylinder stocks:		
600 S.R. unfiltered	.15½	.16
630 S.R. unfiltered	.16½	.17
600 flash, S.R.	.17½	.18
650 flash, S.R.	.20	.20½
Bright stock:		
Light, 25 pour point		.21

NEUTRAL OIL

200-3 color		.27
150-3 color		.25

PARAFFIN WAX

NEW YORK (prices per lb.)—

123-125 A.m.p.		.05600
125-127 A.m.p.		.05600
128-130 A.m.p.		.06150
133-135 A.m.p.		.0640
135-137 A.m.p.		.07150
Crude scale:		
124-126 w.s.	.02½	.02¾
124-126 y.s.	.02½	.02½

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DESIRE first mortgage loan of $65,000 on large oil lease with twenty wells producing and eighteen more inside proven locations. Most rigid investigation invited. Address Box K-770, The Oil and Gas Journal, Tulsa, Oklahoma.

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SEMI-PROVEN acreage, Yoakum Co., Texas, 10 yr. oil and gas lease for sale on S. Half Sec. 596 at $60 per acre. Dr. J. A. Robinson, Veterans' Adm. Facility, North Little Rock, Arkansas.

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Help Wanted

DESIRE to contact rotary drillers who worked in Wyoming prior to 1929. Address P. O. Box 2603, Tulsa, Oklahoma.

WANTED: Experienced micropaleontologist for duty in West Indies by a major oil company. Applicant should be competent and have good background in study of Tertiary and Upper Cretacious Faunas South American or Mexican experience and a knowledge of Spanish desirable but not essential. All replies should give experience in detail, advise age and marital status, state salary expected. Box K-751, The Oil and Gas Journal, Tulsa, Okla.

WELDING engineer, graduate metallurgist with experience in welding practice. Battelle Memorial Institute, Columbus, Ohio.

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5 Lines	1.75	3.00	4.25	5.50	9 Lines	3.15	5.40	7.65	9.90
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Caterpillars, crawler type, size "35," $375; size "65" with nigger-head winch $750; Caterpillar RD8 with bulldozer $2000; Allis-Chalmers Model L with bulldozer $1750. Guaranteed, slightly used. O. C. Evans, Mt. Sterling, Ky.

FOR SALE—Cable-tool drilling outfit complete with steel derrick, 120 HP Clark drilling engine, no tools. Capable drilling 5,000 feet. Located in Young County, Tex.

Wilson Spudding and clean-out unit complete with all tools, light plant, steel doghouse and mast. Located in Pottawatomie County, Oklahoma. Address Box 1098, Shawnee, Okla.

CLEVELAND TRENCHER Model 110 powered by Hercules motor. Capacity 10" and 14" wide, 5½' deep. Entire machine recently overhauled and in very good condition. Lowboy and stripping shoe included. 4212 Marquette, Houston, Texas.

25 K.W. and 40 K.W. Gas Engines, 220 volts, D.C. Two 100 K.W. Gas Engine-Generator Sets, 220 volts, D.C. 7x6 Ingersoll-Rand ER-1 Air compressor. Six-inch Oster Pipe Threading Machine. Also large stock of lathes, pipe machines, milling machines, etc. Send for our list.
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Gulf Coast Markets

(Continued from Page 235)

sure of excessive stocks, quotations generally were unchanged. Most sellers still are unable to see any early relief, and are merely awaiting developments.

Inactivity also still prevailed in coastal neutral oils, although with the coming of colder weather suppliers are expecting an early pickup in demand. All quotations are unchanged.

New York Markets

(Continued from Page 235)

$1.70 per barrel and Bunker C in a range of $1.15 to $1.25. Demand for both products continued slow. The lower Bunker C price was credited to smaller suppliers while the major companies maintained their quotations at $1.25. Industrial fuel oil likewise continues easy and there were a few reports that No. 6 fuel oil could be obtained at prices as low as 3.25 cents. Major suppliers, however, continued to post their prices at 3.85 cents with the lowest confirmed quotation being 3.35 cents.

Pennsylvania lubricating oils gave no indication of emerging from their protracted slump and, while prices were reported the same in most quarters, there was evidence of increasing weakness in cylinder stocks. Since this is normally the offseason for heavy motor-oil stocks and with their export market wiped out, Pennsylvania refiners do not regard the immediate future with any degree of optimism.

The protracted weakness in Pennsylvania lubes has been offset to some degree by continued good gasoline prices that have been experienced throughout the year. Prices have held at a range of 5¾ to 6 cents for gasoline in the 72 to 76-octane range and despite the lateness of the season are still apparently well maintained at those levels.

Michigan Fields

(Continued from Page 228)

Clare County

Surrey Township: Gulf 1 Ben Streib, E½ SE SW 11-17n-5w, dry, T.D. 4,030 ft.
Winterfield Township: Taggart Bros. 39 Wyman-Theares, SE 29-20n-6w, 7,830,000 cu. ft. gas, T.D. 1,318 ft.

Isabella County

Fremont Township: Chapman et al 1 Dora Peacock, N½ SW SW 22-13n-5w, dry, T.D. 3,530 ft.

Kent County

Lowell Township: Smith Petroleum 1 Charles Sterzick, NE NE SW 34-6n-9w, dry, T.D. 2,211 ft.
Paris Township: Swanson Consolidated 1 Frost, NE SE NW 33-6n-11w, dry, T.D. 2,007 ft.
Walker Township: Maynard L. Smith 2 Burgess-Green, SE SE NW 32-7n-12w, 1,000,000 cu. ft. gas, T.D. 1,162 ft.
Wyoming Township: Temple & Lininger 1 Whalen, SW SE NW 14-6n-12w, dry, T.D. 1,914 ft.

Lenawee County

Clinton Township: Voorhees 1 Irving Gove, NE SW SW 8-5s-4e, dry, T.D. 4,060 ft.
Deerfield Township: Consolidated Developers 1 Gilbert LaVoy, SE NE NW 25-6s-5e, dry, T.D. 2,492 ft.

Missaukee County

Riverside Township: Taggart Bros. 38 Shurman et al, SE 16-21n-7w, 11,440,000 cu. ft. gas, T.D. 1,448 ft.

Montcalm County

Home Township: Belvidere 1 Curtis et al, SE NW SE 16-12n-6w, gas test, dry, T.D. 1,295 ft.

Ottawa County

Tallmadge Township: Gordon et al 2 Harm Daling, NW SW SE 14-7n-13w, 126 bbl., acid, T.D. 1,850 ft.

Tuscola County

Wisner Township: Norman Carr 1-A Boyce Farming Co., SE NW SW 24-14n-7e, 150 bbl., natural, T.D. 3,445 ft.

Van Buren County

Columbia Township: Thompson & Fetchett 1 Summy et al, SW NE NE 12-1s-15w, dry, T.D. 1,175 ft.
Clapsaddle, Harris & Fulton 9 Pepper, SE NE NE Sec. 23, 200 bbl., acid, T.D. 1,209 ft.
Pine Grove Township: Charles W. Cook 1 William Hofacker, SE SW NE 35-1s-13w, dry, T.D. 1,284 ft.
Waverly Township: Twin Drilling Co. 1 Crowell et al, S½ SW SE 19-2s-14w, dry, T.D. 1,075 ft.

CRUDE-OIL PRICES IN REPRESENTATIVE FIELDS

Complete crude-price schedules are now being published in the first issue of each month. The last complete schedule was published in the September 5 issue. All changes in crude-oil-price schedules will be published completely in the first issues following the announcement of the changes. Following are representative crude-price schedules in barrels (42 gal.):

East Texas	$1.10
Conroe	1.27
Tepetate, Louisiana	1.03
Smackover, Arkansas, heavy	.73
Illinois basin	1.15
Pecos County, Texas	.78
Lance Creek, Wyoming	.77
Bradford, Pennsylvania	1.85

Gravity Schedules

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

	Signal Hill, California*	Oklahoma, Kansas	Gulf Coast, Texas
14-14.9	$0.65	....	....
15-15.9	.65	....	....
16-16.9	.65	....	....
17-17.9	.65	....	....
18-18.9	.65	....	....
19-19.9	.69	....	$0.86
20-20.9	.73	$0.70	.88
21-21.9	.78	.72	.90
22-22.9	.82	.74	.92
23-23.9	.86	.76	.94
24-24.9	.90	.78	.96
25-25.9	.95	.80	.98
26-26.9	.99	.82	1.00
27-27.9	1.03	.84	1.02
28-28.9	1.07	.86	1.04
29-29.9	1.10	.88	1.06
30-30.9	1.14	.90	1.08
31-31.9	....	.92	1.10
32-32.9	....	.94	1.12
33-33.9	....	.96	1.14
34-34.9	....	.98	1.16
35-35.9	....	1.00	1.18
36-36.9	....	1.02	1.20
37-37.9	....	1.04	1.22
38-38.9	....	1.06	1.24
39-39.9	....	1.08	1.26
40-40.9	....	1.10	1.28

*Effective Feb. 1, 1940.

Crude-Oil Price Changes

Effective September 12, 1940, Sun Oil Co. posted $1.10 for crude purchased in the new Fig Ridge field, Chambers County, Texas Gulf Coast. The same date the company added two additional gravity postings for Mirando crude: 25-gravity, 98 cents; 26-gravity, $1. Previously top price was 96 cents for 29-gravity and above.

Simrall Corp. of Mount Pleasant, Mich., has posted a price of 97 cents per barrel for Hamilton (Clare County) and Grout (Gladwin County) grades of crude it was announced last week. The posting places the two fields 10 cents below Temple grade and 13 cents below Buckeye grade crudes, the differential in price being due to the high sulfur content of the two new fields. The Hamilton field has only the discovery well, pumping 60 bbl. daily, while the Grout field has two wells pumping a total of 65 bbl. daily.

Imperial Oil, Ltd., effective 7 a.m. September 12, advanced postings on Turner Valley, Ontario, crude oil 3 cents per barrel. The new prices are $1.22 for 40-40.9-gravity with a 2-cent differential for each degree to a top price of $1.70 for 64-64.9-gravity.

INDEX TO ADVERTISERS

A

Abercrombie Pump Co.
AC Spark Plug Division of General Motors Corporation
Acme Fishing Tool Co.
Adams Mfg. & Engineering Co. 212
Aero Exploration Co. 186
Air Reduction Sales Co. 1
Alco Products Division of American Locomotive Company
Allis-Chalmers Mfg. Co. 16-17
Allison, R. J.
American Blower Corporation
American Bosch Corporation
American Cable Division of American Chain & Cable Co., Inc.
American Cast Iron Pipe Company 206
American Hoist & Derrick Co. 136
American Iron & Machine Works
American Locomotive Company, Diesel Engine Division 123
American Meter Company 40
American Roller Bearing Co.
American Rolling Mill Co., The 110
American Steel & Wire Company 28
Armstrong Bros. Tool Co. 165
Armstrong Machine Works 147-201-218
Ashcroft Gauge Division 192
Athey Truss Wheel Co.
Auer, C. L., and W. W.
Axelson Manufacturing Company

B

B and M Construction Corp. 191
Baash-Ross Tool Company
Babcock & Wilcox Tube Company, The
Badger & Sons Co., E. B.
Baker Oil Tools, Inc.
Baldwin De La Vergne Sales Corp. 42
Baldwin-Duckworth Division of Chain Belt Company
Bantam Bearings Corp.
Baroid Sales Division, National Lead Company 27
Barret, William M., Inc. 223
Barrett Company, The 106
Beaird Corporation, J. B. 207
Bechtel Co., W. A. 129
Bethlehem Steel Co.
Braden Steel Corporation 94
Bradford Motor Works, Inc.
Brauer Machine & Supply Company
Brewster Company, The
Bridgeport Machine Company, The
Bristol Company, The 20-21
Broderick & Bascom Rope Co.
Brown Instrument Company, The 31
Bruning, Charles Co., Inc. 19
Buckeye Traction Ditcher Co. 38
Bucyrus-Erie Co.
Buda Co., The
Burgess Battery Co. 213
Busch-Sulzer Bros. Diesel Engine Co. 108
Butler Manufacturing Co.
Byron Jackson Co. 105

C

Cable, Jo H.
Cameron Iron Works, Inc.
Campbell, E. M. & Co. 225
Cardwell Mfg. Co., Inc. 2
Carey Company, The Philip 47
Carnegie-Illinois Steel Corporation 46
Cast Iron Pipe Research Association, The 68
Caterpillar Tractor Co. 10-11
Cavins Company 218
Central Forging Co., The 120
Century Electric Company 14
Cessna Aircraft Company
Chain Belt Company
Champion Machine & Forging Co., The 169
Chaplin-Fulton Mfg. Co., Inc. 165
Chapman Valve Mfg. Co., The 45
Chemical Process Co., Inc., The 217
Chevrolet Motor Division, General Motors Sales Corporation
Chicago Bridge & Iron Company 170-171
Chiksan Tool Co. 219
Clark Brothers Company 116-117
Classified Advertising 238-239
Cleveland Trencher Company 196
Climax Molybdenum Company
Coffing Hoist Co. 166
Columbia Gas & Electric Co. 33
Columbia Steel Company 28-46
Columbian Steel Tank Co.
Connelly Iron Sponge & Governor Co. 202
Continental National Bank of Fort Worth
Continental Oil Co.
Continental Motors Corp. 203
Continental Supply Company, The 96-97
Cooper, Fred E. 144
Cooper-Bessemer Corp., The 127
Core Laboratories, Inc.
Crane Co. 7
Crutcher-Rolfs-Cummings 136
Curtin, W. H., & Co., The 230

D

D & M Machine Works
Darling Valve & Mfg. Co. 29
Davis Regulator Mfg. Co., The 146
Dayton Rubber Mfg. Co., The
Dearborn Chemical Co. 142
Dempsey-Wilson Construction Co. 178
Diamond Chain & Mfg. Co.
Dodge Division, Chrysler Corporation 30
Dowell Incorporated
Dowzer Construction Co. 207
Dragon Mfg. Co., The
Dresser Mfg. Co., The 71

D

Drilling Equipment Directory
Duff-Norton Manufacturing Co., The
Du Pont de Nemours & Co., Inc.
Duramatallic Corp.
Durnite Protective Coatings Co. 136

E

Eagle-Picher Lead Co. 167
Eastman Oil Well Survey Co.
Economy Electric Lantern Co.
Elastic Stop Nut Corp.
Electrical Facilities Co.
Emsco Asbestos Company 218
Emsco Derrick & Equipment Company
Engineering Laboratories, Inc.
Engineering Specialties Co., Inc. 228
Ensign Carburetor Company, Ltd
Ethyl Gasoline Corporation

F

First National Bank of Fort Worth
First National Bank in Houston
First National Bank & Trust Co. of Tulsa, The 210
Fisher Governor Company
Fluid Packed Pump Co.
Fluor Corporation, Ltd., The
Ford Motor Co.
Foreman, C. S., Co. 181
Fort Worth Chamber of Commerce
Fort Worth Clearing House Association
Fort Worth National Bank, The
Foster Wheeler Corp.
Foxboro Co., The
Frick-Reid Supply Corporation 140-141

G

Gardner-Denver Company 12
Garlock Packing Company, The
Gaso Pump & Burner Mfg. Co. 102-103
Gasoline Products Co., The
Gates Rubber Co., The
Gatke Corporation 219
General American Transportation Corporation—Terminal Division
General Electric Company 162
General Paint Corporation 8
General Power, Inc.
Geological Scientific Service Company
Geophysical Service, Inc.
Gilmer Company, L. H.
Girdler Corporation, The
Goodrich Company, B. F., The 3
Goodyear Tire & Rubber Co.
Gott, H. P., Mfg. Co. 201
Goulds Pumps, Inc. 39
Graver Tank & Mfg. Co., Inc. 13
Gray Processes Corporation, The
Great Lakes Steel Corporation
Green Head Bit & Supply Co.
Guiberson Corporation
Gulf Oil Corp.
Gulf States Utilities Co. 148

H

Haering, D. W., & Co., Inc. 166
Hall & Company, R. B. 187
Halliburton Oil Well Cementing Co.
Hanlon-Buchanan, Inc.
Hanrahan, W. G. (Bill) 183
Harley Sales Co.
Harnischfeger Corporation 168
Harrisburg Steel Corporation 126
Hazard Wire Rope Division of American Chain & Cable Co., Inc. Inside Back Cover
Hewitt Rubber Corp. 24
Hill-Hubbell & Co. 8
Holland Construction Co. 178
Holmberg Aerial Survey Co. 165
Homelite Corporation 169
Honan-Crane Corp. 206
Houston Lighting & Power Co. 157
Houston Pipe Line Co. 137
Houston Pipe Appliance Co.
Hughes Tool Co. Back Cover
Humble Oil & Refining Co.
Hydril Co. Front Cover

I

Independent Exploration Company
Industrial Engineering Co. 50
Inferno Co., The
Ingersoll-Rand Co. 44
International Harvester Co. 74
International Nickel Company, Inc., The 48

J

Jadson Motor Products Company
Jarecki Manufacturing Company 143
Jensen Brothers Manufacturing Co.
Jerguson Gage & Valve Co.
Johns-Manville Corporation 223-229
Jones Company, The S. M.
Jones & Brooks, Inc. 176
Jones & Laughlin Steel Corporation
Jones, T. R. 190
Justrite Mfg. Co. 120

K

Kansas Gas & Electric Co. 150
Kellogg, M. W., Company, The 25
Kennedy Valve Mfg. Co., The 112
Kerotest Manufacturing Company
Keuffel & Esser Co. 18
Kobe, Incorporated

L

L-K Pump Valve Company 205
Laminated Shim Company, Inc.
Landis Machine Company, Inc. 5
Lane-Wells Co., The
Larkin Packer Company, Inc.
Latex Construction Co. 187
Layne & Bowler, Inc.
Leeds & Northrup Co.
Le Roi Company
Leschen, A., Sons Co.
Lincoln Electric Company, The
Linde Air Products Co., The 35
Line Scale Co., Inc.
Link-Belt Company 34
Little, I. C. 181
Lockheed Aircraft Corporation
Lone Star Cement Corporation
Long, S. A., Co., Inc. 219
Lucey Export Corporation
Ludlow Valve Mfg. Co., The 188
Lufkin Rule Co. 225
Lummus Co., The
Lunkenheimer Co., The 26

Mc

McEvoy Company
McGregor Working Barrel Company
McKissick Products Corp.

M

MacClatchie Manufacturing Company 218
Macwhyte Co.
Magnolia Airco Gas Products Co. 1
Maloney Tank Mfg. Co.
Manhattan Rubber Mfg. Division 164
Manning, Maxwell and Moore, Inc. 192
Marley Co., The 4
Marmon-Herrington Co., Inc. 192
Marsh, James P., Corp. 147
Martin-Decker Corp.
Mayes Brothers, Inc. 180
Mayfair Hotel
Medart Company
Meehanite Research Institute
Merco Nordstrom Valve Co. Inside Front Cover
Mercoid Corporation
Metric Metal Works 40
Mid-Continent Engineering Co., Inc.
Mid-Continent Supply Company
Midwest Piping & Supply Company, Inc., The 23
Midwestern Engineering & Construction Co. 189
Minneapolis-Moline Power Implement Company
Mission Mfg. Co., The 15
Mitchell Stewart Corp. 184
Monsanto Chemical Company
Morse Chain Company
Murray Rubber Company 213

N

National Bank of Tulsa 114
National Carbon Co., Inc.
National Production Co. 219
National Steel Corporation
National Supply Co., The 92-93
National Transit Pump & Machine Co.
National Tube Co.
Naylor Pipe Company 113
Nelson, J. B.
New Bedford Cordage Co.
Newman, Hender & Co., Ltd. 227
Norton Company
Novo Engine Co. 223
Nugent, Wm. W., & Co., Inc. 137

O

O.C.S. Mfg. Co., The
Oil Well Supply Co.
Oliver United Filters, Inc.
Osage Metal Company
Otis Pressure Control, Inc.

P

Page Fence Association
Page Steel & Wire Division of American Chain & Cable Co.
Parkersburg Rig & Reel Co.
Parkhill Truck Co. 184
Parkhill-Wade
Patterson-Ballagh Corporation 214
Pease, C. F., Company, The 128
Peerless Pump Division of Food Machinery Corp.
Penberthy Injector Co. 67
Pennsylvania Grade Crude Oil Association
Perco, Inc.
Petroleum Advisers, Inc.
Petroleum Electric Power Association 152-153
Petroleum Rectifying Company
Phelps Dodge Refining Corporation
Pipe Line Service Corporation 193
Pittsburgh-Des Moines Steel Company 37
Pittsburgh Equitable Meter Co. 132-133
Pittsburgh Steel Company
Plymouth Cordage Co.
Poist Tool Co.
Powell, Wm., Co., The 138
Price, H. C., Co. 175
Pritchard, J. F., & Co.
Producing Equipment Directory
Public Service Co. of Northern Illinois 154
Pure Oil Co.

R

Reading-Pratt & Cady Division of American Chain & Cable Co.
Rector Well Equipment Co., Inc.
Reda Pump Co.
Reed Roller Bit Company
Regan Forge & Engineering Co.
Reilly Tar & Chemical Corporation 165
Republic Rubber Division of Lee Rubber & Tire Corp. 121
Republic Steel Corporation 32
Rockford Drilling Machine Division of Borg-Warner Company
Roebling's Sons Company, John A.
Ryerson & Son., Inc., Joseph T.

S

Safety Gas Main Stopper Co.
Schlumberger Well Surveying Corporation
Sealed Power Corp.
Security Engineering Co.
Seismic Explorations, Inc.
Seismograph Service Corp.
Shafer Bearing Corporation 222
Shand & Jurs Co.
Sheehan Pipe Line Construction Co. 183
Shell Oil Company, Incorporated
Sinclair Refining Company, Inc.
Skinner Co., M. B.
Smith, A. O. Corporation
Smith Company, E. M.
Smith Company, Howard
Smith, H. C., Oil Tool Co. 219
Smooth-On Mfg. Co., Inc. 166
Socony-Vacuum Oil Co., Inc. 22
South Chester Tube Co.
Southwestern Gas & Electric Company 160
Spang Chalfant, Inc.
Spang & Company
Sperry-Sun Well Surveying Co.
Spicer Mfg. Corp.
Standard Bag Mfg. Co.
Standco Brake Lining Co. 218
Stanley Belting Corporation
Star Drilling Machine Co., The
Staynew Filter Corp. 111
Stearns-Roger Manufacturing Co.
Steel Founders' Society
Sternberg, C. W. 187

T

Taylor Forge & Pipe Works 146
Taylor Instrument Companies
Technical Oil Tool Corporation, Ltd.
Texaco Development Corporation
Texas Electric Service Co. 159
Thermoid Company
Timken-Detroit Axle Co.
Timken Roller Bearing Company 6
Timken Roller Bearing Company, Steel and Tube Division 43
Tobin, Edgar, Aerial Surveys 130
Toledo Pipe Threading Machine Co., The
Trackson Company 36
Tretolite Company 9
Trinity Portland Cement Company
Truman-Smith Construction Co. 187
Tubbs Cordage Co.
Tube-Turns, Inc.
Tulsa Boiler & Machinery Co.
Tulsa Chamber of Commerce
Tulsa Machinery Co. 213
Twin Disc Clutch Co. 208

U

Union Carbide and Carbon Corp. 35
Union Wire Rope Corporation
Unit Rig & Equipment Company
United Gas Pipe Line Co.
United Geophysical Co.
United States Rubber Company
United States Steel Corp., Subsidiaries 28-46
United States Steel Export Company 28-46
Universal Atlas Cement Co.
Universal Exploration Co.
Universal Oil Products Co. 72

V

Vickers, Inc.
Viking Pump Co. 225
Visco Products Company 101
Vogt, Henry, Machine Co.

W

Walles Dove-Hermiston Corp. 124
Walker, W. L., Co. 139
Wall-Colmonoy Corp.
Wall Rope Works, Inc. 218
Walworth Co. 98
Warren Petroleum Corporation 118
Waukesha Motor Co. 198
Wedge Protectors, Inc. 167
Well Equipment Manufacturing Corp.
Well Surveys, Inc.
Western Geophysical Company
Westinghouse Electric & Mfg. Co. 156
Wheeling Machine Products Company 142
Whitaker, O. C., Co. 179
Whitney Chain & Mfg. Co., The
Wickwire Spencer Steel Company 79
Williams Brothers Corp. 172
Wilson Manufacturing Co., Inc.
Wisconsin Motor Corporation 228
Witte Engine Works
W-K-M Company, Inc.
Worthington Pump & Machinery Corporation 41
Wyatt Metal & Boiler Works

Y

Youngstown Sheet & Tube Co.

The Oil Man's Calendar appears on Page 80